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TREATING OVERWEIGHT PATIENTS

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EXCESS WEIGHT has become a medical problem of increasing importance in recent years. This has been due to a gradual awareness by the public of the influence of weight on disease. The knowledge that a person can accomplish weight reduction without suffering slow starvation, prostrating weakness, agonizing hunger pains, or the cynical remarks of friends has been obscured by psuedoscientific writings in the popular press. These writings are larded with testimonials and advocate the use of secret formulas which promise miraculous results. Magazines continually skirt the edge of scientific knowledge with their advice on methods of weight reduction through the use of appetite-appeasing drugs. Beauty culture establishments entice the ladies with courses of massage, calisthentics, or dancing, each accompanied by diets which range from simple starvation to simple nonsense. Not to be outdone, the appliance builders advertise belts, girdles, supports, and various mechanical "reducers" which, with the same promise of weight reduction, they sell our more corpulent brothers.

The medical profession, through its failure to educate the public in proper eating habits, is largely responsible for the present uncertainty regarding obesity diets. Doctors have been so preoccupied with the problems of trauma and disease that they have ignored the public's growing interest in the problem of excess weight. There are indications that the average physician feels the problem of excess weight is so time consuming and unrewarding that it does not merit his interest. This discussion will not go into dietary detail, but rather it will attempt to provide a method—an approach that may enable us to cope more successfully with these patients.

The simplest to prepare and most easily obtainable high-protein, high-fat, low-carbohydrate diet, and the one that will produce the most rapid loss of weight without hunger, weakness, lethargy, or constipation, is made up of meat, fat, and water. The total quantity eaten need not be noted, but the ratio of three parts of lean to one part of fat must be maintained. Usually within two or three days, the patient is found to be taking about 170 Gm. of lean meat and 57 Gm. of fat three times a day. Black coffee, clear tea, and water are unrestricted, and the salt intake is not reduced. When the patient complains of monotony, certain fruits and vegetables are added for variety. The overweight patient must be dealt with as an individual. He usually needs help in recognizing the factors at work in his particular case as well as considerable education in the matter of foods.

Chairman's address, read before the Section on General Practice at the 106th Annual Meeting of the American Medical Association, New York, June 4, 1957.

An overweight patient is defined as one whose weight is more than 10% above the average for his age and height, with allowance for hereditary and familial characteristics. Dublin and Marks' study of life insurance records indicates that the normal weight for persons aged 25 to 30 years is the ideal weight and that this weight should remain constant throughout life.[1] The vast accumulation of medical literature on obesity and related subjects is characterized by a lack of simple, easily understood, clinically applicable dietary instructions for daily use which will produce lasting results. Patients, however, when supplied with simple rules, sensible methods, tasteful diet, sympathetic understanding, regular supervision, and encouragement, will produce long-term results that are quite surprising in their effectiveness.

The opinion, generally held, that excess weight has a deleterious effect on the body and that its presence is a cause of such disease as arteriosclerosis, diabetes, hypertension, and myocarditis is not easily proved. From statistical evidence, there is little doubt that excess weight increases mortality rates in all age groups, and the earlier the age at which excess weight appears the greater the increase in mortality rates. Independent studies of Barr [2] and Dublin [3] indicate that, as a group, overweight individuals, when excess weight has been lost and normal weight is maintained, will have mortality rates not significantly different from rates of groups whose weight has always been normal. Thus, while we have indirect evidence that the popular opinion in regard to the harmfulness of excess weight is correct, we have no direct evidence. A survey of the current literature failed to produce a single study in which the conclusions were supported by carefully documented clinical or experimental evidence. The greater mass of words on this subject appears to be unsubstantiated opinions, expressed with vigor and conviction but offering little proof of scientific value.

Popular Explanations for Excess Weight

The popular explanations now being offered by lay and medical writers for the excess weight that individuals are concerned about merits some mention. For purposes of our discussion, we exclude disease types of obesity such as myxedema, Fröhlich's syndrome, diseases of the central nervous system that are found in the presence of hypothalamic lesions, and glandular syndromes of considerable rarity. This leaves the common or simple type of obesity, which is present in the largest number of our overweight patients and which will be the subject of this discussion. This common simple type of overweight is considered by most individuals and, I am sorry to add, by many physicians to be due to thyroid or glandular malfunctions —a theory long since discredited by many excellent writings in the field of metabolism. One of the more comprehensive of these writings is by Newburgh,[4] whose paper I commend to all who are inclined toward the glandular theory.

Another explanation, very popular at the present, is one advanced by the psychiatrists.[5] This theory would place the blame for excessive eating on all sorts of fetal, infantile, childhood, adolescent, and adult emotional conflicts. If one subscribes to this school of thought and is aware of the number of examples of excess weight in the audience at a medical convention, he is forced to the conclusion that the medical profession is extremely maladjusted emotionally. Then we have the reasonable concept that the American people are the best-fed people in the world and have at their command the most food, in its most acceptable forms. We have the highest level of economy in the world and the most ingrained habits of self-satisfaction of any people. This habit of satisfying our tastes by overindulgence of good food is, I believe, the most rational explanation for the great number of patients we must treat for excess weight.

The knowledge of fat and carbohydrate metabolism is rapidly being advanced as more studies utilizing radioactive isotope techniques are reported. It has been demonstrated that, while the total quantity of fat in the body is being reduced, fat has been simultaneously synthesized from carbohydrate containing tagged carbon atoms.[6] This would indicate the presence of some mechanism under whose control the storage or utilization of carbohydrate and fat is maintained. Metabolism research indicates a complex interrelationship of enzymatic and hormonal influences, stimulated or depressed by changing blood and tissue levels of carbohydrate, fat, and the end-products of their oxidization.

The clinical application of this mechanism to our problem of excess weight can be stated thus: If the carbohydrate intake is held well within the capacity of the tissues to oxidize the pyruvic acid formed from it, then all the carbohydrate ingested can be completely changed to carbon dioxide and water. Restriction of carbohydrate intake removes the stimulus to insulin production, so that the fat-storage activity of insulin will be held to a minimum. The anterior pituitary fat-mobilizing principle will then predominate over the fat-storing forces. Fat will be mobilized from the adipose deposits of the body, oxidized to ketones in the liver, and circulated to the tissues in this easily combustible form.[7] By whatever dietary method reduction of excess weight is accomplished, this normal mechanism of ketogenesis must be brought into play, for it has long been known that, while carbo-

hydrate can be readily converted into fat in the body, fat cannot be converted into carbohydrate in any significant amounts.

According to Pennington,[7] Dr. Vilhjalmur Stefansson, anthropologist and arctic explorer, observed that Eskimos were never obese when following their accustomed diet of lean and fat meat but that obesity appeared among them with great rapidity when concentrated carbohydrate foods were introduced. During calorimetric tests at the Russell Sage Institute in 1928, a man lost excess weight while eating a diet of lean and fat meat with a calorie value of 2,000 to 3,000 calories daily. As 80% of the calories in this diet were derived from fat, it was apparent that his body was able to burn more food on this diet than on an ordinary mixed diet.[8] Kekwick and Pawan[9] recently reported significant loss of weight on a calorie intake of 2,600 per day, provided this intake was given mainly in the form of fat and protein. These observations, when considered together, would support the idea that a high-fat, high-protein, low-carbohydrate diet should be beneficial, regardless of which mechanism was considered to be the cause of the excess weight—excessive carbohydrate intake or faulty carbohydrate metabolism.

Application of Present Knowledge

To successfully apply our present knowledge of metabolism to the clinic patient with excess weight requires more than a scientific understanding of the chemical and enzyme reaction involved in his make-up. If one is to guide an overweight patient successfully through a program of weight loss and then to maintain the weight, it is necessary to utilize the patient's own emotional drives and personality needs to stimulate and direct his efforts. If a woman decides to reduce because her family and friends urge her to do so, success is not often obtained. However if she decides to reduce to increase her own attractiveness, it is not difficult to carry out a successful program and to obtain and maintain the desired result. The overweight businessman is seldom sold on the idea of losing excess weight by the desires of his wife and family. However, his cooperation is readily obtained when the problem is discussed in terms of efficiency, rates of depreciation of bodily mechanisms, and tables of longevity. The general fact that a 30% increase in weight before the middle decades increases the mortality rates as much as 75 and 80%[10b] is one the businessman readily understands, as he deals in factors of obsolescence and depreciation daily in his business.

The need to individualize the approach, to adjust the diet to the patient's taste, to develop the confidence and desire of the patient by simple and easily understood explanations, and to constantly guide the first few steps of the program are obvious factors for success. Still, the average physician does not bother to carry them out. The most brilliant and studious physician is of no use to his patients unless he can gain their cooperation and guide them through the steps that are necessary for continued good health. It has been found that the cooperation obtained and the results achieved are directly related to the interest and effort expended by the physician. The sure way to be unsuccessful is to have your nurse weigh the patient, then do a rapid physical examination, dash off a prescription for the newest combination of drugs, hand out a printed diet sheet, and say, "Come back in a month and let's see how much weight you have lost."

In general, physicians treat patients with excess weight by prescribing drugs or diet or a combination of these. For patients with simple excess weight, there is no drug available which, when used without additional therapy, will cause a loss of weight. I can find no series of cases reported in which the double-blind technique of medication was employed where results demonstrate effective loss of weight from the use of drugs alone. Thyroid has no effect on weight loss. Amphetamine-type drugs by themselves do not cause loss of weight, and their use in mixtures containing thyroid, bulk-producing substances, and cathartics should be condemned. The appetite-appeasing effect of the amphetamines may be of limited benefit in selected cases when combined with the education in and use of proper eating habits. Especially beneficial are the long-acting forms now available which are combined with sufficient amounts of sedative to avoid side-reactions so common in patients using the amphetamines. I find that Dexamyl Spansules (sustained-release capsules containing dextro amphetamine sulfate and amobarbital) are helpful in establishing the success of a program in the first few weeks, while education and diet adjustment are being established. Rarely do I use the rapid-acting forms of appetite-appeasing drugs.

Natural Diets

Proper eating is the natural and complete answer to the problem of excess weight. The words diet and dieting should be avoided. To the patient with excess weight, these words have acquired a meaning associated with a miserable, frustrating experience, ending in failure to reach even the most modest goal of weight reduction. This is especially true with patients who have had previous experience with total reduction of food or low-calorie diets in which starvation was obtained by counting calories. Starvation can result in nothing but failure for two very sound reasons. First, starvation reduces weight,

not by selective reduction of adipose deposits but by wasting of all body tissues. Starvation is accompanied by weakness, loss of energy, lethargy, constipation, and other unpleasant side-reactions, and, when the starvation diet is discontinued, the excess weight is regained. Second, starvation makes no effort to correct the original cause of excess weight. Therefore any success obtained must be maintained by chronic undernourishment, with the attendant long-range disastrous consequences common in malnutrition.

That the usual low-calorie diet is rarely successful is readily understood in the light of our present knowledge of carbohydrate and fat metabolism. A low-calorie, low-fat diet is usually unsuccessful due to the ease with which the carbohydrate present is converted into fat by the body coupled with the fact that the presence of carbohydrate suppresses the fat-mobilizing ability of the pituitary gland and increases the fat-depositing activity of insulin.[10] Also, this type of diet is usually deficient in bulk, as its caloric value is derived from concentrated type foods; hence, a constant feeling of emptiness accentuates the patient's desire to eat. With low-calorie diets, no effort is made to reeducate the patient with respect to eating habits, so that, if normal weight is attained, the original defect in eating habits remains uncorrected. To be successful, any method of reduction of excess weight must correct the basic underlying cause which led to the original weight gain.

It is possible to lose weight without counting the calorie intake, without being weak, hungry, lethargic, irritable, and constipated. There is no magic or mystery, no fancy rules to follow, and the entire program may be successfully conducted without radical change in one's normal routine. True, there are many small items that enhance the speed of weight loss, but the key to long-term success is the simple return to normal eating habits. Normal eating habits might be described in technical language as adhering to a high-protein, high-fat, low-carbohyrate diet.[11]

Several years ago, while I was considering a personal problem of excess weight, it became evident that huge numbers of calories in my daily total came from three to four large glasses of milk, two to three bottles of soft drinks, numerous slices of bread, and an educated taste for cookies, candy, and sweets in general, all of which are concentrated carbohydrates. Cereal grains, historically, were cultivated in order that limited agriculture areas might supply food to support population densities not otherwise possible. They are concentrated forms of food, readily assimilated by the body, containing small residue of bulk, and so may be eaten in quantities far in excess of the calorie needs without sensation of fulness. All carbohydrate foods and most drinks fall into this category, either by virtue of their origin or the reaction of the body to them. Milk is actually a liquid infantile food, the use of which man has carried over into his adult life and which, in general, satisfies the definition of concentrated carbohydrate.

The simplest to prepare and most easily obtainable high-protein, high-fat, low-carbohydrate diet and the one that will produce the most rapid loss of weight without hunger, weakness, lethargy, or constipation is made up of meat, fat, and water. The total quantity eaten is not important, but the ratio of three parts of lean to one part fat must be maintained, as any decrease in the fat portion will reduce the weight loss. Few people can consume 12 oz. of lean meat and 4 oz. of fat three times a day. Usually, within two or three days, the average will be about 6 oz. lean meat and 2 oz. fat three times daily. I have yet to find a patient on this diet who complained of not having enough to eat, of tiredness, weakness, or constipation. The type of meat and method of cooking are immaterial, although cured or so-called luncheon meats are less effective. Few meats have adequate fat naturally present, so fried suet is added to maintain the proper ratio. Black coffee, clear tea, and water are used without restriction. Reduction of salt, while not required, will increase the speed of weight loss. From a practical standpoint, two to four weeks is about the limit a patient will continue this diet, so, at the first complaint, it is modified by the addition of all 3% and 5% fruits and vegetables for the sake of variety. This produces sufficient change to maintain patient cooperation for a long time, with continued weight loss and without disagreeable side-effects.

For patients who eat away from home and for maintenance of weight in patients who have completed weight-loss programs, we use a simple rule to direct their eating. They are allowed meat with fat, vegetables, fruit without juices, and no added salt but other seasoning to taste. They are instructed to eat their meat and fat first, using a salad seasoned to taste for variety; to follow with vegetables, including potatoes; and to complete their meal with fruit for dessert. This provides a diet high in protein and fat, moderate in carbohydrate, and containing large amounts of bulk and a moderate amount of salt. To illustrate the use of this rule, for dinner this evening order a rare steak, baked potato, chef's salad with Roquefort dressing, spinach, cauliflower or stringbeans, and black coffee. Eat the meat with the salad; follow with vegetables and potatoes to satisfaction; ignore the rolls and fancy dessert; drink water, black coffee, or plain tea.

Reeducation in Eating Patterns

In conjunction with the modified meat, fruit, and vegetable diet I use, in selected cases, a long-acting appetite-appeasing drug for the first few weeks while educating the patient into the proper method of eating. This, I find, gains the cooperation of the patient and provides time to reeducate him in his patterns of eating and to adjust food items to his individual needs. I prescribe a small number of capsules, check the patient's weight regularly, discuss individual eating problems, and answer questions. Once progress is established and the patient becomes aware that the loss of weight is the result of proper eating habits, the withdrawal of medication has presented no problem. Rather than list the details of the composition of food, I endeavor to show the principle by which successful weight reduction can be obtained and weight maintained. This is a matter of education of ourselves as well as the overweight patient to cultivate more natural eating habits which, if followed, will correct the basic cause of overweight without the intolerable suffering of restrictive starvation-type diets.

In this paper, as with patients, I purposely refrained from discussing the rapidity with which weight is lost. On any diet, no matter how restrictive, there may be several days of actual weight gain before the diet's effect becomes apparent. Also it is well known that when weight loss occurs it does not follow a constant day-to-day pattern. Actual weight loss occurs in bursts, interspaced with periods of near-stationary weight, but the over-all pattern is a predictable one and should average approximately 1.5 lb. per week or 6 to 8 lb. per month. On the strict meat, fat, and water diet, this loss is often increased 100%. The more moderate diets are most practical for long-term use. Patients are instructed to weigh themselves at weekly intervals, using the same scale, at the same time of day, with the same stage of dress and to record the date and weight in a notebook.

For women, and they comprise the vast majority of dieting patients, the phenomenon of weight gain associated with menstruation is explained, and its appearance in the patient's weight chart is noted. With all patients, the reasons for weight loss in sudden bursts is discussed—that fluid, shifting from its relatively stable intercellular position through the cell wall to the extracellular space, where it becomes available for excretion from the body, is not a continuous process, and that periods of sudden weight loss occur at irregular intervals which correspond to this shifting of body fluids in response to the diet.[12] The whole process of educating the overweight patients and establishing and maintaining a more normal pattern of eating habits entails discussing all of the factors which may be present in a particular case. This cannot be done by the use of mimeographed instructions, diet sheets, or prescriptions. To those who are especially interested in detailed instructions for patients, I suggest you refer to those outlined by Pennington.[13]

Summary

The patient with excess weight not caused by disease must be dealt with as an individual whose excess weight may be due to excessive carbohydrate intake or a disturbance in his carbohydrate metabolism. Evidence from widely different sources, when examined in light of recent metabolism studies, seems to justify the use of high-protein, high-fat, low-carbohydrate diets for successful loss of excess weight. There are apparent defects in the rationale of the commonly used low-calorie restrictive diets, and there should be a return to a more natural type of diet. Drugs may be used, but their defects should be considered. Common foods such as cereals and milk are excellent, but, in my way of thinking, they have no place in the diet of the overweight individual.

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ARTIFICIALLY INDUCED ASIAN INFLUENZA IN VACCINATED AND UNVACCINATED VOLUNTEERS

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Fever, chills, and other symptoms characteristic of influenza appeared in 18 out of 23 (78%) unvaccinated volunteers about 38 hours after the nasopharynx was sprayed with nasopharyngeal secretions containing living virus from three influenza patients. The virus was influenza A/Valley Forge/57, which was antigenically similar to the Far East strain. When the same material was administered to 32 volunteers who had been vaccinated against influenza A/Japan/305/57, the cases of febrile illness numbered 14 (44%). The vaccination and the challenge inoculation both induced a hemagglutination inhibition antibody response. Influenza virus was recovered from 14 (41%) of ill volunteers. The vaccination therefore gave significant though incomplete protection against Asian influenza.

Many epidemiologic studies of inactivated influenza virus vaccines have demonstrated substantial protection against the epidemic disease,[1] whereas other studies have shown little or no such protection.[2] It has been generally concluded that the vaccines were effective when they contained adequate amounts of a virus strain antigenically similar to the epidemic strain and when administered from one to six months prior to the epidemic. One of the chief problems has been to incorporate next year's epidemic virus strain in a vaccine available for use prior to the epidemic. The difficulty arises from the frequent slight to marked changes in the antigenic composition of epidemic strain viruses. A marked change in type A influenza virus occurred in 1946-1947. Moderate changes occurred from 1948 to 1956,[3] and a drastic change occurred in the spring of 1957.[4] It was desirable to know at an early date whether a vaccine made from this new drastically different virus strain would be effective.

In 1942, Henle and associates [5] demonstrated that a rapid answer to vaccine effectiveness could be obtained through observing illness induced by intranasal inoculation of live virus into vaccinated and unvaccinated volunteers. This was confirmed through similar studies by Francis and associates in 1943.[6] The present report describes similar studies in volunteers using the new Far East strain vaccines. In brief, on July 24 and 26, 70 volunteers were given either a new strain vaccine or a placebo control in such a manner that neither they nor the observers knew who had received which product. The vaccine induced a substantial complement-fixing and hemagglutinating antibody response. On Aug. 12, and again on Aug. 22, 32 and 23 volunteers, respectively, were inoculated intranasally with live virus (influenza A/Valley Forge/57) which was antigenically similar to the Far East strain virus. Two to three days after challenge, a large proportion of the volunteers developed acute febrile illnesses, many of which were clinically considered classic influenza. The illnesses were confirmed as influenza by virus isolation during acute illness and by hemagglutination inhibition (HI) antibody responses. The illnesses were significantly less prevalent in the vaccinated than in the placebo group, thus demonstrating that the vaccine gave moderate protection against challenge-induced Asian influenza. However, the protection was far from complete, as many cases occurred in the vaccinated group.

From the U. S. Department of Health, Education, and Welfare, Public Health Service, National Institute of Allergy and Infectious Diseases, Laboratory of Infectious Diseases (Drs. Bell, Kapikian, Shelokov, Reichelderfer, and Huebner) and the Lobund Institute, University of Notre Dame (Dr. Ward).

Materials and Methods

Vaccines.—Two commercially prepared monovalent influenza vaccine products were used. They were labeled A and B and were reported by the manufacturers to have 200 and 506 chicken cell agglutinating (CCA) units per milliliter respectively. (The CCA values of each final product were determined by Dr. Bernice Eddy of the Division of Biologics Standards, NIH, and vaccine A and B were found to have 250 and 275 CCA units respectively. Dr. Eddy notes that it is impossible to demonstrate full CCA activity of virus in the final product after adsorption on protamine precipitate.) Both were early lots containing A/Japan/305/57 strain virus and both satisfied National Institutes of Health (NIH) requirements for identity and safety.

One was prepared and furnished by Parke, Davis & Company, who state that the virus-containing egg-passage fluid was concentrated a calculated 22 times and inactivated by ultraviolet irradiation with thimerosal 1:10,000 added as preservative. The other product was prepared by Merck, Sharp &

Dohme, who state that the virus-containing egg-passage fluid was concentrated 5.5 times by protamine precipitation and was inactivated by formalin 1:5,000 with thimerosal 1:10,000 added as preservative.

Inoculum.—The inoculum consisted of nasal pharyngeal washings collected from Boy Scouts attending the 1957 Jamboree at Valley Forge, Pa., who had acute febrile illness resembling influenza. The specimens were obtained by instilling 10 ml. of isotonic sodium chloride solution into each nostril and then collecting the mucus-containing fluid exuding from the mouth and nostrils. Approximately 10 ml. was recovered and quickly frozen in a carbon dioxide–acetone mixture at bedside. In addition, a throat swab specimen was collected in 5 ml. of Earle's balanced salt solution [6A] with 5% calf serum. Such specimens were obtained from 15 Scouts from southern California. Influenza virus antigenically similar to the Far East influenza strain was isolated from eight of these throat swab specimens. These eight specimens were pooled with their respective nasal pharyngeal washings and each was tested bacteriologically for common pathogens and virologically in monkey kidney and HeLa cell tissue culture mediums and inoculated into suckling mice. Specimens collected from three boys appeared to be completely free from pathogenic agents other than influenza, and titrations in hemagglutination adsorption monkey kidney cell culture [7] indicated 10^4-10^5 infectious particles per milliliter of washings. The washings from these three were pooled and diluted 1:3 with Eagle's base mediums [8] and divided into three nearly equal vials and refrozen. Two of these were used as the inoculum for the first and second volunteer groups. To each milliliter of the diluted pool, 250 units of penicillin and 250 units of streptomycin were added prior to use in volunteers. The inoculum was maintained at –50 C at all interim stages.

Inoculation was preceded by instillation of 3 ml. of sterile isotonic sodium chloride solution into each nostril of the volunteer while he was recumbent, enabling him to clear his nostrils of all mucus and washings. The oral pharynx was then vigorously swabbed with a cotton-tipped applicator dipped in the inoculum, approximately 0.3 ml. being used. Then the inoculum was sprayed into each nostril and the oral pharynx by a DeVilbiss atomizer while the volunteer was inhaling (two squeezes of the bulb in each nostril and one squeeze into the oral pharynx), each squeeze delivering 0.06 ml. of the inoculum or a total of approximately 0.3 ml. Approximately 0.3 ml. of inoculum was then instilled in a nostril. Thus each volunteer received less than 1 ml. of the diluted inoculum. By calculation each volunteer received perhaps less than one drop (0.07 ml.), certainly less than two drops, of nasal pharyngeal secretions which had been diluted twice and frozen and thawed three times.

Serologic Studies

Blood specimens were collected from each volunteer prior to vaccination and prior to challenge (17 to 29 days after vaccination) and again 15 to 18 days after challenge. The complement-fixation (CF) test was performed with the influenza A/Japan/305/57 egg allantoic fluid antigen by the Bengtson technique,[9] with use of overnight fixation in the cold room. The seed virus in the antigen had an egg-ferret-mouse-egg passage history. Normal uninfected egg allantoic fluid antigen controls showed no fixation with the serums used. All prevaccine and postvaccine serums were tested in one test run.

The HI tests performed at the NIH used standard techniques with influenza A/Japan/305/57 egg allantoic fluid antigen and human "O" erythrocytes. The seed virus of the antigen had not been passed through animals. The serums were treated overnight at 37 C with equal volumes of a receptor destroying enzyme (RDE). The prevaccine and postvaccine serums, and the prechallenge and postchallenge serums were tested in separate test runs with the latter being more sensitive.

All prevaccine and postvaccine serums were also tested for HI antibodies independently in Dr. Jensen's laboratory (the Communicable Disease Control Laboratory [CDC]). He used an egg-ferret-mouse-egg antigen and chicken cells. The serums were treated overnight with M/90 solution of potassium periodate.[9]

Throat swabs for virological study were collected from all volunteers routinely on the second and fourth day after challenge and at other times as indicated. The swabs were wrung out in vials containing 3 to 5 ml. of Hanks' balanced salt solution, which was immediately frozen in carbon dioxide. Specimens collected the second day after challenge were tested for influenza virus by standard chick embryo inoculation procedures and by hemagglutination adsorption techniques in monkey kidney tissue cultures.[7]

Throat swabs for bacteriological studies were collected from all volunteers at the time of challenge, two to three days later, and again as indicated particularly from prolonged illness. The swabs were streaked on blood agar and modified Levinthal agar which was considered adequate for detection of aerobic beta-hemolytic Streptococcus, iridescent Hemophilus, Pneumococcus, and beta-hemolytic Micrococcus (Staphylococcus) pyogenes var. aureus.

Study Volunteers.—The volunteers were healthy male inmates of the Patuxent Institution of the Maryland State Board of Correction at Jessup, Md. On July 24 and 26, 70 volunteers were given a single 1-ml. injection in the triceps muscle of one or the other vaccines or a placebo consisting of sterile saline solution. By a predetermined random sampling procedure, 30% received vaccine A, 30% received vaccine B, and 40% received placebo C.

The first test group of 32 volunteers was selected from the 70 by a random sampling process so as to consist of 8 volunteers each in the vaccine A and vaccine B groups and 16 in the placebo C group. These were challenged on Aug. 12 with live virus as previously described. A second test group of 23 volunteers (10 vaccine A, 6 vaccine B, and 7 placebo C) were challenged Aug. 22, with an aliquot of the same inoculum in an identical manner. It was planned that the second test group be selected in a similar manner, with 12 volunteers in each vaccine A and B group and 8 in the placebo group. However, the illness in the first group was more marked than the volunteers had expected and this influenced an unduly large number of last-minute refusals. The ages of the total 55 volunteers in the two challenge groups were from 21 to 57 years (median 25 years), while 65% were white and the remainder Negro.

Prior to challenge of each test group, a medical history and physical examination showed that each volunteer was in good health and free from acute respiratory illness. Each volunteer was isolated in an individual cell and inoculated with live influenza virus as previously described. Volunteers were kept under constant medical observation for nine days, including the routine taking of temperatures sublingually at 7 a. m. and 7 p. m. Two of us independently made daily medical records of the physical condition of each volunteer, and others of us independently made medical records of all volunteers during the periods of acute illness. Medication consisted of aspirin and phenobarbital as needed; tetracycline was given only to patients with pulmonary findings.

Results

Attributes such as age, race, and presence of tonsils were tabulated in order to check the adequacy of the sampling procedure used for separating volunteers into vaccine and placebo groups and into first and second challenge groups. These attributes were found to be distributed among the groups as near equally as could be expected by chance sampling variation, thus confirming the comparability of these groups.

None of the volunteers gave a history of allergy to eggs or to chickens. No immediate local or general reactions followed vaccination, except for an infrequent, nondisabling tenderness of the triceps muscle of no consequence.

The isolation procedures were effective insofar as no influenza occurred in custodial staff or in inmates who did not receive the challenge inoculum.

Antibody Response to Vaccine.—Prevaccine and postvaccine (prechallenge) serums were tested for both HI and CF antibodies. Figure 1 shows that the vaccine was antigenic, since 44% of the vaccinees had a fourfold or greater rise in HI titer and 70% had a fourfold or greater rise in CF titer, whereas no rises to either antigen occurred in the placebo group.

Figure 1 also shows good comparability of the HI test results in the two laboratories. This is particularly noteworthy, in view of the different materials and techniques used (see above). A correlation table of positive and negative inhibitions at each specific titer showed complete agreement between the two laboratories in 72% of 90 tests made with aliquots of the same serums. Agreement within a twofold range occurred in 92%, while disagreement of a fourfold or greater range occurred in only 8%. Since the CDC test did not include all volunteers, the NIH test results are the ones referred to hereinafter.

In the 55 prevaccine and preplacebo serums, all except 4 had a titer of $\leqq$1:8 in the CF test while in the HI test one of these had a titer of $>$1:10. Within the limits of this test, only one of the 55 volunteers had prestudy evidence of past experience with the Asian influenza virus antigens.

Eighteen volunteers received vaccine A containing 200 CCA units, whereas 14 received vaccine B containing 506 CCA units. There were no appreciable differences in the CF antibody responses induced by the two vaccine products. The HI antibody responses tended to be poorer in volunteers who received only 200 CCA units, but the small difference in these numbers could well have been due to chance sampling variation. As will be shown later, the percentage of the vaccine A and B group who developed illness was nearly equal.

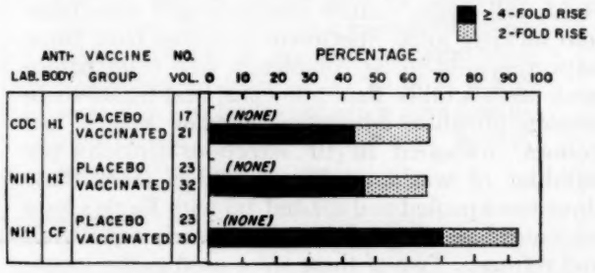
≥ 4-FOLD RISE
2-FOLD RISE
ANTI- LAB.
BODY
VACCINE GROUP
NO. VOL.
PERCENTAGE
0 10 20 30 40 50 60 70 80 90 100
CDC HI PLACEBO VACCINATED 17 21 (NONE)
NIH HI PLACEBO VACCINATED 23 32 (NONE)
NIH CF PLACEBO VACCINATED 23 30 (NONE)

Fig. 1.—Serologic response to vaccine. Percentage of volunteers with prevaccine to postvaccine HI and CF antibody response by vaccine group.

The postvaccine serums in the first challange group were collected 17 to 19 days after vaccination, and in the second challenge group 27 to 29 days after vaccination. There was no apparent difference in either the CF or HI responses between the first and second challenge groups.

Illnesses After Challenge.—The challenge groups of Aug. 12 and 22 were inoculated with the live virus at approximately 11 a. m. Routine temperatures were taken before challenge, 8 hours later at 7 p. m., and every 12 hours thereafter for nine days. Volunteers having temperatures of 37.7 C (100 F) or higher were classified as having fever. The 55 volunteers were classified as having no febrile illness or a febrile illness either mild or moderately severe. Classification was based on the occurrence of fever and other definite clinical manifestations

on which the independent findings of different medical observers were in essential agreement. During the nine days of observation after challenge, no definite clinical manifestations occurred in 23 volunteers and those were classified not ill. It should be noted that 4 of these 23 (two vaccinated and two placebo controls) had a single p. m. temperature of 37.7 to 37.9 C on the second or third day after challenge, but they were classified as not ill because they did not feel ill and had no definite clinical manifestations. Of the 32 who had a febrile illness, 13 were classified as having a mild illness, and 19 were classified as having a moderately severe illness.

Figure 2 shows the percentage of volunteers having fever during each succeeding 12-hour period after challenge. This objective observation shows a definite time relation between the challenge and the occurrence of fever, since a high proportion of volunteers had fever on the second to fourth day after challenge, whereas none had fevers during the early and late observation periods after challenge. The figure also shows that the vaccine group had a lower prevalence of fevers than the placebo group.

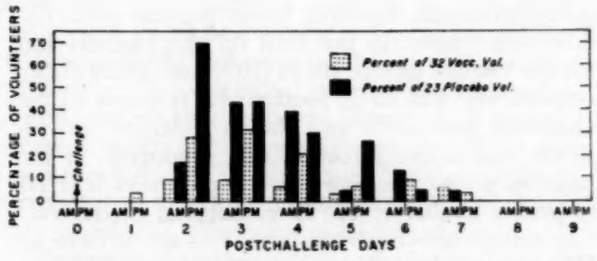

Fig. 2.–Prevalence of fever. Percentage of vaccinated and unvaccinated volunteers with fever (≧37.7 C [100 F] by day after challenge.

Table 1 shows the time relation between challenge and onset of clinical manifestations of illness. It is striking that 30 of the 32 illnesses were first recognized by the observers on the second or third day after challenge. Projection of these to the most probable time of actual onset revealed that 24 of the total 32 illnesses had onset 33 to 44 hours after challenge. This is good evidence that the illnesses were caused by the challenge inoculum. It compares favorably with the generally accepted incubation period of influenza. One notes the trend toward, and questions the significance of, the shorter incubation period for the bulk of the moderately severe cases. The mild and moderately severe illnesses which had onset on the fifth day were both in the vaccinated group. Specimens taken the second day after challenge on these two cases have not demonstrated influenza virus. The mild case had no serologic HI response to vaccine but had an eightfold rise in the prechallenge and postchallenge serums while the moderate case had a good response to vaccine but no fourfold response to challenge. The unduly long incubation period in these two cases of the vaccinated group lends some doubt as to whether they were influenza, but, for the purpose of this report, they are included as influenza illness.

Table 2 shows the percentage of volunteers with various clinical manifestations among the 13 with mild and the 19 with moderately severe illnesses

TABLE 1.–*Number of Febrile Illnesses by Day of Onset After Challenge, According to Vaccine Group and Severity of Illness*

Group	Severity of Illness	Days After Challenge 0-1	2	3	4	5	6-9	Total	
Vaccine	Mild	0	2	3	0	1	0	6	14
	Moderate-severe	0	7	0	0	1	0	8	
Placebo	Mild	0	4	3	0	0	0	7	18
	Moderate-severe	0	11	0	0	0	0	11	
Tota.		0	24	6	0	2	0	32	

and among the total volunteers in the vaccine and placebo groups. It is apparent that in the illnesses classified as moderately severe there was a greater aggregate of clinical manifestations (particularly in those that might be considered "classic" influenza), higher temperatures, and tended to have a longer duration of illness. In general clinicians without laboratory aid would probably diagnose the mild cases as influenza only during an epidemic. It may also be noted in table 3 that the general aggregate of clinical manifestations was similar in

TABLE 2.–*Percentage of Ill Volunteers with Specified Clinical Manifestations by Severity of Illness and by Vaccine Group*

Specified Clinical Manifestations	Severity of Febrile Illness: Mild	Moderate-Severe	Total	Febrile Illness Vaccine Group: Placebo	Vaccine
No. of ill volunteers	13	19	32	18	14
	%		%	%	
Coryza	77	100	91	89	93
Headache	77	100	91	94	86
Pharyngeal erythema	77	100	91	89	93
Sneezing	69	100	88	83	86
Cough	62	100	84	83	86
Disabling illness	39	100	75	78	71
Malaise	31	100	72	78	64
Anorexia	23	100	69	78	57
Ocular pain	15	95	63	61	64
Chills or chilliness	15	84	56	67	43
Muscle, bone, or joint aches	15	84	56	61	50
Sore throat	23	58	44	50	36
Maximum temperature					
37.7-38.2C (100-100.9F)	55	11	28	17	43
38.3-38.8C (101-101.9F)	23	58	44	33	57
≧38.9C (≧102F)	23	32	28	50	0
Duration ≦3 days	69	58	62	44	64
Illness ≧4 days	31	42	38	56	36

the vaccine and placebo groups, whereas ill persons in the placebo group generally had higher temperatures and illnesses of longer duration.

A typical definite case had a rather sudden onset, about 38 hours after challenge. Initial symptoms were commonly coryza, sneezing, severe headache, and fever. These and other manifestations, namely marked malaise, anorexia, scratchiness of the throat,

dry cough, ocular pain, marked muscle, bone, and joint aches, and chills or chilliness, were most intense during the first day or so of illness and then gradually subsided. The mean duration of illness was four days, with a mean temperature of 38.8 C (101.8 F). In the typical case the patient was disabled and insisted on bed rest. A few patients

TABLE 3.—*Number of Volunteers with Challenge-induced Influenza (Febrile Illness) by Vaccine Group and Prechallenge HI Antibody Titer*

Vaccine Group	Prechallenge Post-vaccination HI Titer	Total Volunteers	No Illness		Febrile Illnesses				
					Moderate	Severe	Total Illness		
			No.	%	Mild		No.	%	
Total Volunteers		55	23	42	13	19	32	58	
Placebo	All <1:10	23	5	22	7	11	18	78	
Vaccinated Total		32	18	56	6	8	14	44	
Vaccinated	<1:10	10	4	40	2	4	6	60	
	1:10 & 1:20	14	8	57	3	3	6	43	36
	≧1:40	8	6	75	1	1	2	25	

began to feel better on the second or third day and then had a recurrence of marked clinical manifestations, including fever. Hoarseness was observed in only one patient, nausea seldom occurred, and none had vomiting or diarrhea. The cough occasionally persisted for two or more weeks after the acute phase was over.

In the daily physical examinations a typical patient had the appearance of lethargy and weakness, and his face was either pallid or flushed. During the acute phase, the patient often refused to leave his bed for examination. He would wrap himself in a blanket during chills and cast it off as the chill abated and the fever set in. The pulse and respiratory rate did not rise commensurately with the fever. The pharynx was perhaps more erythematous than normal but there was no exudate and no notable lymphadenopathy. There were no abnormal cardiac findings. Pulmonary findings were normal in all except three moderately severe cases. Two of these had moist crepitant rales in a lower lobe and one had musical rales and coarse ronchi, all of which were confirmed by different observers. These occurred on the third to fifth day of illness and cleared in two to three days.

The total white blood cell count was usually normal during the acute phase, but in several cases it fell slightly; the differential count occasionally showed a relative lymphocytosis. Chest roentgenograms taken on all volunteers on the eighth or ninth day after challenge revealed no abnormalities referable to the illness, even in those who had clinical pulmonary findings. Electrocardiograms before and during the acute phase of illness in all the second challenge group showed no abnormalities referable to illness. Prestudy and acute illness electroencephalograms for four volunteers were studied and showed no essential changes attributable to illness.

Prevaccine and postvaccine and postchallenge serums were studied, together with acute illness serums from six volunteers for muscle enzyme changes. Serum glutamic oxalacetic aminopherase (transaminase), aldolase, and alpha glycerophosphate dehydrogenase showed no changes attributable to either the vaccine or the illness.

Throat cultures for bacteriology were taken on all 55 volunteers before challenge and during the acute phase of illness. No beta-hemolytic group A streptococci were found. H. influenzae (nontypable) was isolated from two volunteers; one was not ill and, although the other developed classic influenza, the colonies were equally prevalent in prechallenge and acute illness throat specimens. Two of the 55 showed pneumococci in prechallenge swabs but neither developed illness. Three of the 55 had group G beta-hemolytic streptococci but in all three this type was equally prevalent in the prechallenge culture. Five had positive beta-hemolytic micrococci pyogenes var. aureus in prechallenge cultures and four others had this organism in postchallenge swabs.

Antibody Response to Challenge.—The paired prechallenge and postchallenge serums were tested for HI antibodies in a single test which was more sensitive than the test of the prevaccine and postvaccine serums. Figure 3 shows the percentage of volunteers having HI titer responses to the challenge inoculum, omitting three persons with unsatisfactory tests. In the total for the placebo and for the vaccine group, 16/23 (70%) and 15/29 (52%), respectively, had an ≧ fourfold HI response to the challenge inoculum; and this is regarded as evidence that active infection was produced. In the placebo group, the five non-ill volunteers had HI responses similar to the ill volunteers. In the vaccine group, non-ill persons were less apt to have an HI response than ill persons and this was so, even when the vaccine group was subdivided into the small numbers having and not having vaccine-induced (prechallenge) HI antibodies. It is noteworthy, however, that both non-ill and ill volunteers

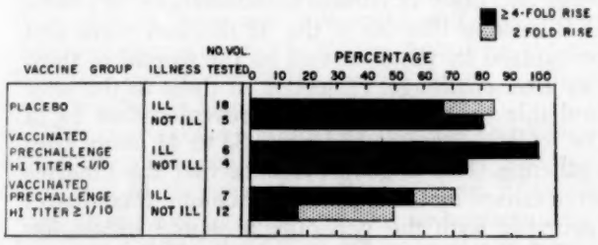

Fig. 3.—Serologic response to challenge inoculum. Percentage of volunteers with prechallenge to postchallenge HI antibody response by illness, vaccine group, and HI response to vaccine.

without prechallenge HI antibodies were more apt to have an HI response to the challenge inoculum than volunteers with such prechallenge antibodies. The numbers are too small to permit the conclusion that the challenge-induced HI response was of value in differentiating between infected non-ill and infected ill volunteers.

Virus Isolations.—Laboratory attempts at virus isolation on the second and fourth days after challenge met with a number of difficulties. However, influenza virus was isolated in hemagglutination-adsorption monkey kidney cell culture[7] from 16 volunteers in the throat specimens taken the second day after challenge. To date, only one of these has been isolated by usual chick embryo procedures. Fifteen of the 16 tested were antigenically similar to the virus strain in the inoculum which antigenically resembled the Far East strain. None resembled influenza/A/Denver/57 or influenza/B/Great Lakes/54 virus. Virus isolations were accompanied by an HI antibody response in all except one of the 15 volunteers tested. Virus was isolated from 41% of 32 ill persons and 13% of 23 non-ill persons. Thus in contrast to the challenge-induced HI antibody response, virus isolations better served to differentiate between infected ill and infected non-ill persons. Vaccine did not influence virus isolation from ill persons, since virus was isolated from 43% of 14 ill vaccinees and 39% of 18 ill unvaccinated volunteers. It is noteworthy that virus was isolated from 28% of all vaccinees and 30% of all unvaccinated volunteers. However, in the vaccinees, illness confirmed by virus isolation occurred in 19% of 32 while such confirmed illness occurred in 30% of 23 unvaccinated volunteers. The virus isolations, serologic evidence, clinical picture, and incubation period confirm that certainly almost all, if not all, illnesses artificially induced were caused by the live Asian influenza virus contained in the challenge material, i. e., the diluted nasopharyngeal washings with which the volunteers were inoculated.

Illnesses Among Vaccinated and Placebo Groups.—Table 3 shows the number of volunteers developing influenza (febrile illness) by vaccine group and prechallenge HI antibody status. Although not shown, the results were consistent in each challenge group. In the total, 78% of 23 volunteers in the placebo group developed influenza, whereas 44% of 32 in the vaccinated group developed influenza. This difference is considered outside the expected range of chance sampling variation ($p=0.01$) and is attributed to protective effect of the vaccine. The table shows, as expected, that none of the placebo group developed HI antibodies after the placebo injection; all remained at $<1:10$ titer, whereas 22 (69%) of the 32 vaccinated volunteers had HI titers $\geq 1:10$ in their postvaccine (prechallenge) serums. Six of the 10 vaccinees showing no response to vaccine developed influenza, whereas 8 (36%) of 22 vaccinees with detectable prechallenge HI antibodies developed influenza. This difference within the vaccine group is not statistically significant, but is consistent with a view that the HI antibodies constituted a crude index of the protective effect of the vaccine.

Although not shown in table 3, 44% of 18 volunteers receiving vaccine A (200 CCA units per dose) and 43% of 14 volunteers receiving vaccine B (506 CCA units per dose) developed influenza. In these small numbers, the product with the higher CCA value did not show any better protection.

As previously noted in figure 2, the volunteers in the vaccine group did not develop fevers to the same extent as the placebo group. As noted in table 2, there was no appreciable difference in proportionate distribution of clinical manifestations of cases in the vaccine and placebo groups, except that the placebo group had higher temperatures and perhaps a longer duration of illness.

Table 4 summarizes some of the clinical manifestations which occurred after challenge in the vaccinated and placebo groups. It shows what happened to the group of vaccinated and unvaccinated persons when exposed to Asian influenza virus. The results appear similar to those experienced by susceptible persons exposed in a family household to a virus positive case in past influenza epidemics.[11] Some do not become infected, some become infected and have no illness, while others develop illnesses of varying degrees of severity and duration. It may be noted in table 4 that in this controlled study, where all persons were exposed

TABLE 4.—*Summary of Clinical Phenomena After Exposure to Asian Influenza Virus in Vaccinated and Unvaccinated Volunteers*

	Vaccinated		Placebo	
Clinical Manifestations	No.	%	No.	%
Total no. of volunteers	32		23	
No fever	16	50	3	13
Febrile episode, total	16	50	20	87
Fever duration, 3 or more days	6	19	9	39
Clinical febrile illness, total	14	44	18	78
Moderate-severe	8	25	11	48
Disabling illness, total	10	31	14	61
Disability duration 3 or more days	3	9	9	39

to live influenza virus, only 3/23 (13%) of unvaccinated persons escaped all clinical findings of illness. On the other hand, vaccinated persons enjoyed some degree of protection against clinical manifestations. They were less apt to develop fever, but if they did it was of shorter duration and temperatures were not as high; they were less apt to develop clinical symptoms, but if they did the symptoms were milder and less apt to be disabling or of as long duration.

Comment

This study of challenge-induced influenza in vaccinated and unvaccinated volunteers was designed to determine at a very early date whether the new commercially prepared inactivated Far East strain influenza virus vaccines would protect against influenza artificially induced with the new strain viruses. An early favorable answer was obtained and reported Aug. 27.[12]

The results of the present study compare favorably in all major aspects with two previous studies of a similar type.[13] Each of the three studies demonstrated that the vaccine and the challenge inocu-

lum both induced an HI antibody response, that the challenge inoculum induced influenza, and that the vaccine conferred protection against influenza. These similarities obtained in spite of many differences in details of methods and materials used and differences in degree of prestudy immunity of the volunteers. In the present study, 78% of the challenged unvaccinated volunteers developed influenza. This was higher than in the previous volunteer studies and lends confirmation to the epidemiologic and laboratory evidence which indicates that our present population has had little prior antigenic experience with Asian influenza viruses. This is consistent with the view that a widespread influenza epidemic is likely to occur in the United States in fall or winter of 1957.

Each of the three studies was designed to determine if the vaccine would protect against influenza. However, the results in the limited number of volunteers that could be studied did not permit an estimate of the amount of protection within narrow confidence limits. In the two previous studies the reported attack rates in the placebo and vaccinated groups were 36 versus 3% and 50 versus 23%, respectively, while in the present study they were 78 versus 44%. The calculated vaccine protection in the present study was 44%, but within a 95% confidence limit it might be as little as 15% or as great as 70%. Even this wide range does not have too much stability because the attack rates vary considerably, depending upon the end-point used for identifying influenza. For example, two vaccinated volunteers had a febrile illness of unduly long incubation period which was classified as influenza. These two cases could not be proved or disproved to be influenza by laboratory methods. If they were not classified as influenza the calculated estimate of protection would have been slightly greater.

It is unknown whether the protection was greater or less than would occur under natural conditions of exposure. It is to be recalled that each volunteer received less than two drops of the pooled nasal pharyngeal secretions, which after dilution with the washing material had 10^4-10^5 infectious particles per milliliter. These secretions were further diluted three times, frozen and thawed three times, and treated with antibiotics, all of which obviously does not occur in the natural transfer of infection from person to person.

A general evaluation of a vaccine weighs the dangers against the benefits. No untoward reactions were observed among volunteers receiving Asian influenza vaccine in the present study. Preliminary observation [14] on Asian influenza vaccine reactions in a community where 2,127 adults and children over one year of age received either the new Asian influenza vaccine (dosage from 50 to 250 CCA units according to age) or a placebo indicate that approximately 7% had systemic reactions attributable to the vaccine with most rather mild and none serious. The benefits may be measured by the prevention of illness. It is recognized that even during large epidemics not all persons are effectively exposed to infection and of those exposed, not all become ill. In this first study on the protection of Asian influenza vaccines all were exposed to influenza virus. Table 4 reflects the favorable influence of Asian influenza vaccines in various clinical manifestations in adult volunteers.

Summary and Conclusions

This report describes the inoculation of vaccinated and unvaccinated adult volunteers with live Asian influenza virus. The inoculation induced infection without illness and infection with illness ranging from mild to moderately severe "classic" influenza. The vaccines gave moderate but incomplete protection against Asian influenza, as 78% of the unvaccinated placebo group and 44% of the vaccinated group became ill with challenge-induced influenza.

W. P. Rowe, M.D., R. A. Chanock, M.D., and J. W. Hartley, Ph.D., and Mr. Enos Stockbridge of the Maryland State Board of Correction and Harold N. Boslow, M.D., Director of the Patuxent Institution, assisted in the conduct of this study.

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All bacteriological studies were carried out by Roger M. Cole, M.D., Chief, Bacteriological Unit, Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases.

The electrocardiograms were taken and interpreted by Arnold L. Nielsen, M.D., of the Public Health Service heart disease control program. The electroencephalograms were interpreted by Curtis Marshall, M.D., Assistant Professor of Neurosurgery, Johns Hopkins Hospital, and consultant to the Patuxent Institution.

The enzyme studies were carried out by Arthur L. Schade, Ph.D., Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases.

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PROBLEMS OF SURGICAL RESIDENCY TRAINING

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It was William Halsted who demonstrated by precept and example that the training of the surgeon encompasses more than the technical aspects of the operation. It was he who first emphasized that the total care of the surgical patient does not end with the operation itself. At the time Halsted was teaching his residents that wounds heal more promptly if tissues are handled gently, and that shock often does not make its appearance, even after prolonged operations, if blood loss is carefully controlled and tissue injury minimal, the great majority of American graduates in medicine who wished to become surgeons were being trained under the preceptorial system.

No one could deny that any training under competent preceptors that added to the trainee's experience was better than no training. However, under the preceptorial type of training the trainee had little time to think for himself. He had little or no opportunity to test his own beliefs by the use of various methods. He was essentially an assistant from the time he apprenticed himself for preceptorial training until he severed this relationship. From early morning until late at night his training was designed to provide, in him, a replica of the man who was training him. In contradistinction to this type of training, the residency system provided, for the first time in the United States, the opportunity for the resident to be looked upon with respect and with dignity.

From the Hospital of the University of Pennsylvania.

Read before the Section on Military Medicine at the 106th Annual Meeting of the American Medical Association, New York, June 6, 1957.

There is much that is inconsistent and irrational in the present methods of training surgeons. The old preceptorial method produced narrowly trained, tradition-bound specialists; the modern internship produces a man qualified, according to the license granted him by his state board, for the practice of medicine and surgery in general, but hardly prepared to give the best type of surgical care. A sufficiently thorough training is imperative for men who plan to go into general surgery, and a thorough training in general surgery is imperative for men who plan to go into surgical specialties. Neither need can be satisfied by civilian hospitals in the face of the constantly decreasing number of surgical ward beds. It can be satisfied by military and Veterans Administration hospitals, which are frequently filled with patients who do not have service-connected disabilities. The relation of civilian to military and Veterans Administration hospitals should be strengthened, and their resources from the standpoint of surgical training should be pooled. This will make it possible, without any lowering of standards, to train more young men in general surgery while also providing the experience in general surgery that is essential for the training of the surgical specialist.

Those trained under the preceptorial system were slow in accepting new ideas and rejecting old ones. Those trained under the residency system had, in general, a more thorough appreciation of the physiological abnormalities imposed on the patient as the result of disease and were better able to care for certain of these abnormalities. Under the preceptorial system the trainee performed a posterior gastroenterostomy for an intractable duodenal ulcer because his preceptor did this operation. If the surgeon drained a gallbladder containing stones, then, as a general rule, the preceptee also drained the gallbladder.

Halsted's Residency System

While William Halsted may not have been the most dexterous of American surgeons, he was certainly one of the most thoughtful. He encouraged his residents to think for themselves and to search for the truth; he encouraged them to search for the truth by experiment. Halsted's system of residency training did not encourage a stereotyped pattern of operative care. It did encourage originality on the part of the trainee. It did encourage the trainee to consider substitutes for the then accepted methods of surgical therapy, and to discard the older methods when the substitutes proved to be more valuable to the complete recovery of the patient. No one can deny the fact that Halsted's system of training dealt a mortal blow to empiricism in surgery.

Halsted's system of training was not a rigid system. It was rigid only in the sense that it demanded the full service of the trainee to his work. The system varied from resident to resident, remaining the same in one regard, that is, with each year in training new opportunities and new responsibilities were open to the resident. It was a highly individualized type of training, frequently tailored for a particular resident. When the importance of the residency system became more generally appreciated, other surgeons accepted this method as the most desirable one for training those who wished to spend their lives in the field of surgery and the surgical specialties.

Role of Specialty Organizations

Many of the surgical residents now completing their training have developed skills which exceed those of the brilliant surgeons of two generations ago. The organization of the American Board of Surgery and Conference Committee on Graduate Training in Surgery has added to the stature of the American surgeon. The Conference Committee on Graduate Training in Surgery, with representatives from the American Board of Surgery, the American College of Surgeons, and the American Medical Association, is responsible for the accreditation of residency training programs of varying lengths within acceptable hospitals in the United States. The American Board of Surgery certifies the intellectual surgical competence of the candidate, after an examination. No one can overestimate the effect which these two organizations have had upon the framework of American surgery.

While there may not be universal acceptance of everything they have done, we must, I believe, look with pride at the accomplishments of these two bodies. In spite of pressures, ofttimes from high places, both of these organizations have stood fast in the belief that the preceptorial system of training is no substitute for good residency training. Two decades ago surgeons were divided in their belief regarding the best method of training, and yet now, after the short space of time that has elapsed since these organizations came into being, there is hardly an honest dissenting voice.

At the end of World War II the number of approved residencies was relatively small, and these residencies could not possibly meet the demands of all those who wished training in general surgery and the surgical specialties. The Conference Committee on Graduate Training in Surgery, tempering justice with mercy, relaxed its vigilance and requirements, accepting the programs of a number of institutions for training which would not under other circumstances have been found to be acceptable. As the number of those requesting training has lessened, the training programs not adequately meeting the requirements of the conference committee have been dropped from the approved list. Nowhere in the world are better surgeons being turned out, at the age level of the American surgeon at the time of certification. Adequately trained in the basic medical sciences, he is more competent than ever before to prepare the patient for operation, to perform the operation, and to provide the best type of after-care.

Specialized Versus General Training

It has been claimed that, since nearly 60% of the surgery being done in the United States is still being done by men who are essentially general practitioners, we must make provisions for short periods of training in surgery for general practitioners in order that they can effectively continue to do the surgery not now being done by trained surgeons. I cannot believe that such a plea will cause those responsible for outlining the requirements of surgical training to relax these requirements. It is the responsibility of the medical profession to provide our patients with the best pos-

sible medical and surgical care. If there is not now a sufficient number of institutions in which men can be adequately trained, we must attempt to provide them. It cannot, however, be denied that, if after a reasonable period of time it is found to be impossible to meet the needs for well-trained young surgeons in the United States by the most acceptable type of training, we may have to resort to substitutes, which, while not nearly so good, are better than nothing at all.

Perhaps the dilemma is not nearly as great as it would appear to be. There are probably numerous institutions in the United States which can provide the opportunity for the final year or two of training where the trainee can have increasing experience and responsibilities. The widespread use of the pyramidal system of training frequently causes the trainee to take his final years of training under a preceptor. Would it not be better to accept additional institutions which would act as satellites of the major training program where the final year or two of training can be given? Is it not possible to utilize these institutions, which frequently have a wealth of material which they are willing to make available to the well-trained assistant resident for his final year or two of opportunity and responsibility under adequate supervision? Such a program would permit a larger group of more adequately trained surgeons to become available for community and military practice.

Half a century ago there were few men who could call themselves specialists in the now major divisions of surgery. Here and there men trained in general surgery developed a special interest in a particular area of surgical effort. It was not long before these specialists were accepting men from the internship for preceptorial training. As the residency training program developed, programs of training for surgical specialists also developed. The very rapidity with which this expansion took place made it obvious that concessions would be made, and they were. Recent graduates who had completed an internship began training in a surgical specialty without any real background in the principles upon which all surgery depends for its safeguards. Those of us who are interested in surgery in its many facets must freely admit that an adequate program of training in the surgical specialties should be preceded by an adequate period of training in general surgery. Those responsible for the surgical specialties were loath to accept this viewpoint and, in fact, at times resisted its acceptance. However, in the last 10 years most of the major specialties, one after another, have made previous training in general surgery voluntary, and, finally, mandatory, as a part of the over-all training of the surgical specialist. Certain of the surgical specialties, however, still do not require training in general surgery to be taken before training in the surgical specialty. The experience of the trainee will be the richer if the training in general surgery is made mandatory before training in the surgical specialty.

And yet, while this concept is gaining momentum and further acceptance, it must be recognized that it is difficult for the young men who wish to become proficient in a special surgical area to obtain one to three years of training in general surgery in most of our better training centers. Some of those persons responsible for the training program in general surgery feel that they cannot provide an equal opportunity for those who wish to become surgical specialists and those who wish to become general surgeons. We must seriously reconsider this whole matter, for the surgical specialties will flourish the better when their candidates have had adequate training in the "mother tree" of all surgery. The people who are responsible for the acceptable training programs in general surgery must not take a selfish attitude in this matter. The very future of our profession may well depend upon their decision.

Other Problems

Many of the civilian hospitals whose training programs are still acceptable to the Conference Committee on Graduate Training in Surgery are finding it difficult to provide the clinical material necessary for the training of young men. The sharp decline in ward material which has taken place during the last 10 years threatens to destroy the very basis upon which a good residency program of training in surgery can be accomplished. This entire matter demands the most careful study in order to find more adequate solutions.

The responsibility which the surgeon accepts when he agrees to take care of the surgical patient is an enormous one. He must assure himself that a reasonably accurate diagnosis has been made and that the patient is in the best possible state to withstand the assault of anesthesia and operation. He must surround himself with assistants who are the best that he can obtain. He must anticipate complications and, if possible, avert them. He must by every possible means speed the recovery of the patient. After he accepts the patient for surgical care, he cannot turn the patient over to a resident in training for operation without the patient's complete knowledge.

These are problems that can be solved relatively simply in the hospitals of our armed forces, the Veterans Administration, and the Public Health Service.

These institutions can, because of the very nature of their organization, set a pattern which will be difficult to achieve in many civilian institutions in the not-too-distant future unless adequate solutions can be found for the constantly decreasing number of surgical ward beds. Those responsible for the conduct of these programs in military, Veterans Administration, and PHS hospitals may before long be faced with an opportunity unparalleled in the history of surgery in this country. They may find it necessary, if they are to fulfill their responsibilities, to train many young men in surgery and in the surgical specialties, not only for their institutions but, in increasing numbers, for a career in civilian life.

The idea is not so far fetched as it would seem to be at the outset. Will these individuals not be brought back to assist in fulfilling the mission of the medical departments of the Army, Navy, and Air Force in times of real need? Many of those members of the armed forces and other governmental services now engaged in a career in surgery or one of the specialties have had their training in civilian institutions. Is it not just as reasonable to look to the military hospitals, with their abundance of material, for assistance in preparing those who wish to remain primarily civilian surgeons and civilian surgical specialists? And yet, while those in training in military hospitals are operating every day on the dependents of military personnel, those in residency training in civilian institutions are not permitted to operate on these same dependents under the Medicare program. Under this program, as administered by the Blue Shield plans in a number of states, the applicant who is applying for the fee for service must certify that he is not a resident.

Is not a resident who has already had several years of special training more competent to provide surgical care than is the intern who has just passed his state board medical licensure examination and thereby received a license supposedly qualifying him for the practice of medicine and surgery? The Blue Shield plans pay such individuals when they have a hospital in which they may operate. And yet these very organizations refuse to pay residents who have had two, three, four, or ofttimes more years of training, because they are still classed as residents. Can the persons who are responsible for the administration of the Blue Shield plans maintain this type of thinking while at the same time they lament the fact that our Veterans Administration hospitals are frequently filled with patients who do not have service-connected disabilities?

Comment

In the military hospitals and in the PHS and Veterans Administration hospitals there is a wealth of material which is available for the training of surgeons and surgical specialists. It is the responsibility of those who administer these institutions to develop men, by accepting the concept of providing increasing opportunity and responsibility, so that the men whom they are training become qualified to practice in that particular area of surgery in which they are interested. It is likewise their responsibility to see that those who are being trained in the surgical specialties have adequate training in general surgery, regardless of whether a specific board requires this or not. It will increase the degree of critical facility of the trainee. It will encourage him to be a continuing student. It will add greatly to what he may later offer to his patients. It must be accepted that the operation is but a part of surgical therapeusis and not the whole of it. If this hypothesis is true, there should in reality be no difference in the training between those who spend their lives in a career in military surgery or a surgical specialty and those who spend their lives in comparable facets of surgery in civil life. Since World War II there has been a continuing strengthening of the relations between our civilian institutions and our military hospitals and the hospitals of the Veterans Administration. This is as it should be. We must continue to strengthen this relationship, and we must pool our resources from the standpoint of surgical training.

We must vigorously and intelligently explore the ways and means whereby an increasing number of young men can obtain adequate basic training in general surgery, to serve as the foundation for advanced training in general surgery, or for a surgical specialty. We must freely admit that this training need not be given in university hospitals, but that more frequently than is now being done it can be given in adequately staffed civilian, military, PHS, and veterans' hospitals. We must explore more actively than has been done the possibilities available to develop satellites for the extension of surgical training.

Many of our great hospitals in teaching centers do not admit large numbers of patients who are the victims of severe trauma. We must provide training in the care of such patients. The very future of our nation may well depend upon the degree of competence gained in the treatment of trauma by young men in training. We must provide such training where it is available, and where men are competent to supervise it. Institutions in which it is not now possible to offer complete training may well be able to supplement the basic training received at the parent institution.

The Conference Committee on Graduate Training in Surgery must take a new look at this matter. Without lowering the acceptable general standards of training it must provide a program which will make it possible to train a larger number of young men in general surgery and provide the basic general surgical training that is now recognized to be important in the training of the surgical specialist.

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INTRAMUSCULAR ADMINISTRATION OF THE ANTICOAGULANT WARFARIN (COUMADIN) SODIUM

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and
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Warfarin is the first synthetic anticoagulant which is clinically available for administration by other than the oral route. Administered intramuscularly in a single dose of 75 mg., the peak effect of hypoprothrombinemia was observed on the second and third day and the total therapeutic effect lasted as long as five days. Injections were made in the upper outer quadrant of the buttocks or, in a few cases, in the deltoid region. The drug was well tolerated by the patients, and serial blood pressure readings showed no significant change. Warfarin was administered intramuscularly to patients in their homes. This presented no unusual problem requiring hospital facilities.

Warfarin (Coumadin) sodium is a new anticoagulant, developed in the laboratory of Prof. Karl P. Link of the University of Wisconsin, from whence the first orally active anticoagulant, bishydroxycoumarin (Dicumarol) issued. Warfarin is a unique prothrombin-depressing agent, since the drug is effective when given orally,[1] intravenously,[2] and rectally.[3] The prothrombin-depressing capacity after intramuscular administration is the subject of this report. Warfarin thus represents the first synthetic anticoagulant which is clinically available for administration by other than the oral route.

Whether warfarin was administered intravenously, orally, or rectally, the therapeutic range was reached at about 24 hours and as a rule lasted for about three to five days, with a plateau of therapeutic hypoprothrombinemia at about 48 to 72 hours after administration. Differences in individual responses occurred, as expected. But, as a rule, an initial dose of 1 mg. per kilogram of body weight, usually 75 mg., by any route, induced the abovementioned hypoprothrombinemia, and daily maintenance doses of 5 to 10 mg. were adequate for most patients.[1]

The effectiveness by the intravenous route suggested the usefulness of parenteral administration, particularly in acutely and severely sick patients suffering from myocardial infarction and/or pulmonary embolism, who could not swallow medicaments because of heavy sedation, shock, nausea and vomiting, or presence of an inserted suction tube or in those patients who showed resistance to bishydroxycoumarin or other synthetic anticoagulants.[4]

Eble,[5] working in Link's laboratory, demonstrated that when warfarin was given intravenously to rats, it diffused rapidly to the tissues and certain organs and was found in maximum concentration in the plasma, liver, and muscle five minutes after injection. The high amounts found in the muscle prompted one of us (S. S.) to administer 75 mg. in 10 cc. in different areas of the gluteal region to suitable candidates for anticoagulant therapy. The response, as determined by the Link-Shapiro modification of the Quick method for estimation of plasma prothrombin time, suggested that the drug was equally absorbed from the muscle as from the vein.[6] In this respect, the compound's behavior in humans is similar to that anticipated from Eble's findings in rats.

From the Lincoln Hospital (Drs. Shapiro and Ciferri) and New York University College of Medicine (Dr. Shapiro).

An examination of the reports on this drug indicates that the incidence of bleeding is low, bleeding occurring mainly in those patients who have recently undergone major surgery. In our own experience with the new drug, given orally, intravenously, or intramuscularly, bleeding has been less than with the earlier available anticoagulants. In any event, very low levels of prothrombin activity, with or without bleeding, were readily counteracted with phytonadione (vitamin K_1, Mephyton) in small doses, administered orally or intravenously. Low levels of prothrombin activity are not necessarily an indication for the use of phytonadione, but they do indicate the need for caution in administering further doses of the anticoagulant until the plasma prothrombin activity reverts to the safe but adequate range of hypoprothrombinemia.

This account reports on our experience with warfarin administered intramuscularly to 35 adult patients with thrombotic or thromboembolic conditions (thrombophlebitis, pulmonary embolism, and coronary artery disease with myocardial infarction), who were on the wards of the Lincoln Hospital or private patients.

Material and Methods

Warfarin, 75 mg., was supplied in two forms for intramuscular administration. The first preparation consisted of 75 mg. in 2 cc. of a 3.5% solution of povidone (polyvinylpyrrolidone); the second, and

the presently preferred form, is a single injection unit consisting of one vial containing 75 mg. of warfarin in powder form with an accompanying 3-cc. ampul of water for injection; the solution can be prepared immediately prior to intramuscular (or intravenous) administration. The responses with both forms were similar; hence the results are treated together with respect to intramuscular injection.

Injections were made in the upper outer quadrant of the buttocks or, in few cases, in the deltoid region. The drug was well tolerated by the patients, and serial blood pressure readings showed no significant change. None of the patients received heparin. The usual initial dose was 75 mg., regardless of body weight. Except in a few cases, anticoagulation, subsequent to the initial dose, was by oral administration.

TABLE 1.—*Response of Prothrombin Time of Twenty-four Patients Who Had Not Received Previous Anticoagulant Therapy to Intramuscular Administration of Seventy-five Milligrams of Warfarin (Coumadin) Sodium*

	Prothrombin Time, in Sec., on Day				
Control Day	1*	2	3	4	5
12.0	21.0	34.0	31.0	27.0	21.0
13.0	19.0	35.0	30.0	19.0	...
15.0	20.0	24.0	23.0	20.0	...
15.0	...	26.0	26.0	23.0	18.0
15.0	27.0	27.0	26.0	24.0	21.0
15.0	19.0	32.0	31.0	27.0	24.0
15.0	21.0	31.0	32.0	27.0	18.0
14.0	22.0	31.0	29.5	27.0	24.5
15.5	26.0	30.5	30.0	25.0	...
13.5	22.0	27.5	29.0	25.0	...
13.0	21.0	30.0	29.0	24.5	...
14.0	25.5	32.5	30.0	27.0	23.5
15.0	24.0	29.0	24.0	...	...
14.0	22.5	29.0	27.5	23.0	...
14.5	25.5	34.0	35.5	30.5	27.0
14.0	20.0	30.5	27.0	23.5	...
13.5	20.0	27.5	23.0	...	...
14.0	23.5	32.5	36.0	29.0	24.5
13.5	19.5	29.0	22.0	...	...
14.0	19.0	27.5	30.5	25.0	...
13.5	22.5	30.0	32.5	27.5	22.0
13.8	23.7	32.5	27.5	...	...
15.0	23.9	29.5	33.5	29.0	24.5
16.0	27.5	33.0	44.5	34.0	29.0

* Day 1 represents time up to 24 hr. In many cases first prothrombin estimation was made before 24 hr. had elapsed.

Estimations of prothrombin time by the Link-Shapiro modification of the Quick method, with Simplastin used as the source of thromboplastin, were made at intervals of 24 hours. No attempt was made to determine the lag period before initiation of hypoprothrombinemia, as in an earlier report on warfarin.[2a] Phytonadione, 20 mg., was administered in one patient who manifested a high prothrombin time, without signs of hemorrhage. A prompt counteraction occurred and oral maintenance therapy was instituted.

Results and Comment

Tables 1 and 2 list the prothrombin response to a single dose of 75 mg. of warfarin administered intramuscularly to 35 patients; 24 had not received anticoagulant therapy previously (table 1); 11 were recovering from a previous dose of anticoagulant (table 2).

The results in the first 24 patients were grouped by days and treated statistically as a unit (table 3) (fig. 1). Analysis of variance for all observations

TABLE 2.—*Response of Prothrombin Time of Eleven Patients Who Had Received Doses of Warfarin (Coumadin) Sodium Previous to Intramusmuscular Administration of Seventy-five Milligrams of Warfarin*

Prothrombin Time, Sec., at Time of Administration	Prothrombin Time, in Sec., on Day				
	1*	2	3	4	5
19	24	25.0	35.0	27	22.0
19	22	37.0	38.0	39	31.0
16	24	34.0	27.0	20	...
19	30	34.0	29.0	18	...
19	29	40.0	35.0	25	20.0
17	22	33.0	25.0	17	...
17	25	35.0	40.0	23	21.0
19	24	33.0	35.0	30	20.0
18	30	31.0	40.0	25	24.0
19	26	31.5	35.0	29	25.5
15	27	40.0	32.5	28	24.5

* Day 1 represents time up to 24 hr. In many cases the first prothrombin estimation was made before 24 hr. had elapsed.

after treatment shows that the groups vary more than expected ($p < 0.01$) relative to the variation within groups. In other words, by comparison with the slight variation in prothrombin time from patient to patient on a given day, the variations for the total group from day to day seem impressively large. This indicates a significant relationship between time and response after a single dose. The standard deviation of a single determination was calculated at $\pm$ 3.2 seconds for post-treatment observations. While these data suggest that significantly elevated values might still be obtained on the seventh and eighth post-treatment days, we did not analyze the results of prothrombin determinations since we were interested in demonstrating the early rather than the late effect of the induction dose and also because oral maintenance therapy was usually started on the fifth day. The conclusion about the significant effect of the drug is valid. In this respect it can be concluded that intramuscular administration of the drug provides essentially the same effect as intravenous administration. This may well be the route of choice when parenteral administration of warfarin is desirable. Since many reports have suggested that the greatest benefit from anticoagulant drugs is derived from administering them at the

TABLE 3.—*Analysis of Data on Prothrombin Time Response in Twenty-four Patients to Initial Intramuscular Doses of Seventy-five Milligrams of Warfarin (Coumadin) Sodium*

Day	No.*	Av. Prothrombin Time, Sec.	±S.E.†
Control	24	14.2	0.2
1	23	22.4	0.5
2	24	30.2	0.6
3	33	28.9	0.8
4	20	25.8	0.8
5	12	23.2	0.9

* No. of patients whose prothrombin time was estimated on given days.

† Standard error of means $= \sqrt{\frac{\Sigma d^2}{N(N-1)}}$

earliest possible moment after a clinical diagnosis has been made, we now prefer to give the drug intramuscularly to attain this goal. There is no discomfort or undue disturbance to the critically ill

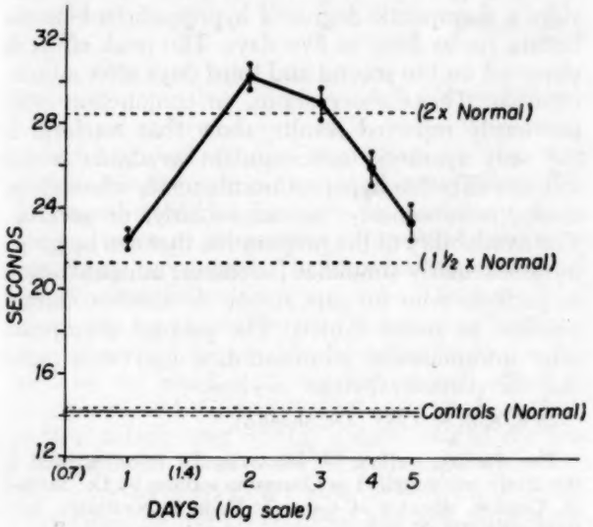

Fig. 1.—Curve derived from data in table 3. Note therapeutic hypoprothrombinemia induced at first prothrombin time determination following administration of drug. Peak effect occurs at second determination, and therapeutic hypoprothrombinemia persists to fifth prothrombin time determination. As a rule, oral maintenance therapy is instituted at day 5.

patient suffering from myocardial infarction or pulmonary embolism. These results show that a single intramuscular administration of 75 mg. of warfarin

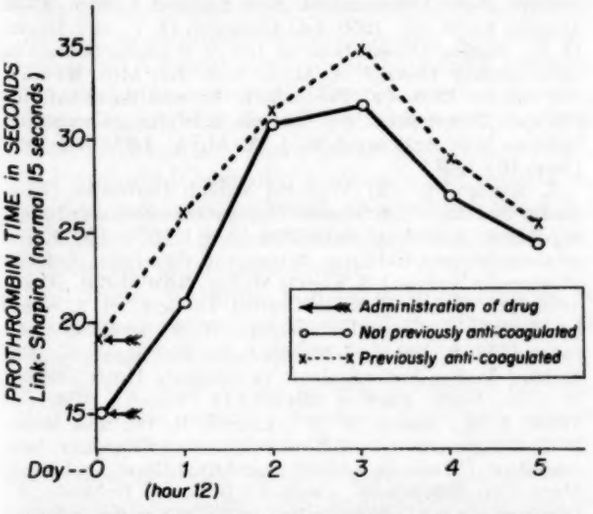

Fig. 2.—Typical response of two patients after single intramuscular dose of 75 mg. of warfarin (Coumadin). Note correlation of individual courses with course for all patients shown in figure 1.

induces a peak within the therapeutic range at the second post-treatment prothrombin time determination. By administering the drug in this manner, the clinician can have confidence that recipients have the benefit of the drug without having to consider gastrointestinal factors which might retard absorption of the drug.

Heparin was not used in any patients in this series. Where heparin is deemed desirable, it can be mixed in the same syringe as the warfarin and given intravenously. The solution may be given separately or mixed with a pressor drug for intravenous administration.

As stated above, prothrombin time determinations were not analyzed beyond day five after the injection, since oral maintenance therapy was initiated as the prothrombin time reached the level of about 1½ times the control value. Warfarin was administered

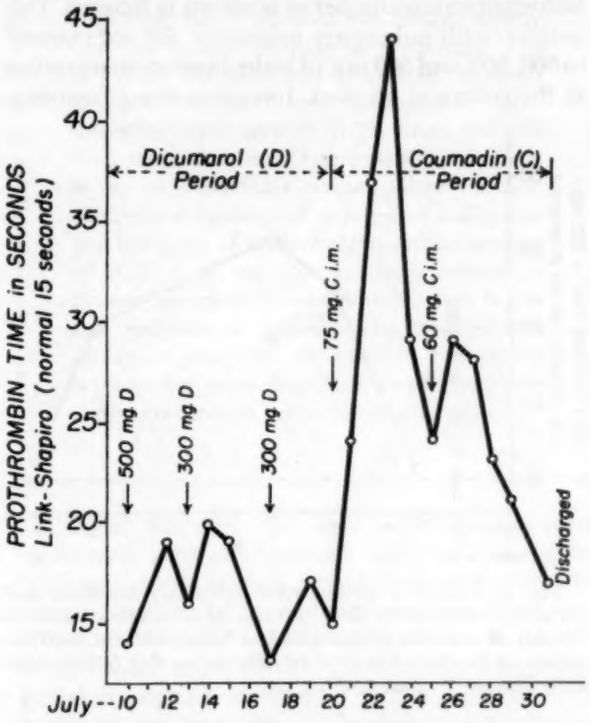

Fig. 3.—Course of patient with pulmonary infarction who was first given bishydroxycoumarin (Dicumarol), with no ensuing prothrombin depression, and then was given warfarin (Coumadin) intramuscularly, with resulting prothrombin depression.

intramuscularly to patients at their homes. This presented no unusual problem requiring hospital facilities. We had previously determined that a delay of about 24 hours after drawing a sample of blood did not have any significant effect on the prothrombin time as determined for that sample.[6] These unpublished results have found confirmation in a recent English report by Watson,[7] who reported no difference in prothrombin time of a blood sample 30 minutes or 24 hours after withdrawal from a vein. Hence, when we administer warfarin at home, the blood sample is transported to the laboratory for prothrombin time determination.

Figure 2 represents a typical result in two patients, one with and one without previous anticoagulant therapy.

In three of the patients with myocardial infarction, data on whom is not included in the tables, excessive prothrombin times without bleeding were observed at 24 and 48 hours after injection. The times reached 52, 43, and 44 seconds respectively. Phytonadione, 20 mg., was administered only in the first instance; the prothrombin time in the other two was allowed to recede spontaneously during the succeeding days.

The usefulness of intramuscularly administered warfarin in a patient who did not respond to bishydroxycoumarin per os is shown in figure 3. This patient, with pulmonary infarction, did not respond to 500, 300, and 300 mg. of bishydroxycoumarin given in the course of six days. Intramuscular administration of 75 mg. of warfarin was followed by a therapeutic degree of hypoprothrombinemia and uneventful recovery. This instance, which is not isolated, underscores the reliability of warfarin to produce therapeutic hypoprothrombinemia. Phytonadione was not given in spite of high prothrombin time on day 12.

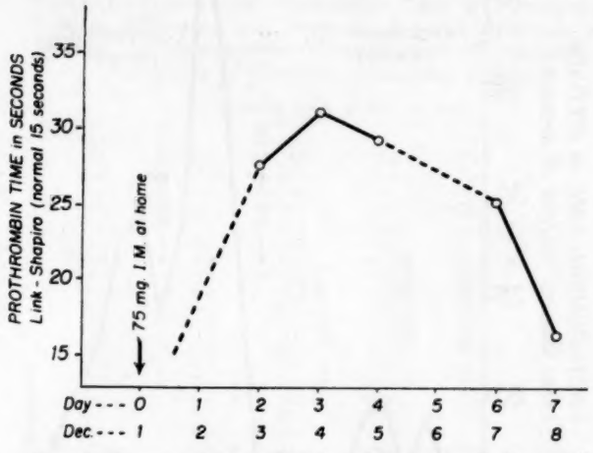

Fig. 4.—Course of patient with pulmonary embolism and coronary insufficiency after intramuscular administration of 75 mg. of warfarin (Coumadin) at home, without determination of prothrombin time initially or on day 5 (compare with Shapiro,[2a] chart 4).

The course of induced hypoprothrombinemia in a patient who was given warfarin intramuscularly at home before removal to a hospital is illustrated in figure 4. This patient exhibited pulmonary embolism with coronary thrombosis when seen at his home on Dec. 1. Warfarin, 75 mg., was administered intramuscularly at the time without initial prothrombin time determination because of the critical state of the patient. He was transferred to a hospital on Dec. 3, when the prothrombin time was well within the therapeutic range. Oral anticoagulant therapy was instituted on day 7. He made an uneventful recovery.

Summary

Intramuscular injection of warfarin (Coumadin) sodium is effective in inducing hypoprothrombinemia. A single intramuscular injection of 75 mg. provides a therapeutic degree of hypoprothrombinemia lasting for as long as five days. The peak effect is observed on the second and third days after administration. These observations, in conjunction with previously reported results, show that warfarin is the only synthetic anticoagulant available which induces effective hypoprothrombinemia when given orally, intravenously, intramuscularly, or rectally. The availability of the preparation that can be given intramuscularly simplifies parenteral administration in patients who for one reason or another cannot swallow or retain tablets. The prompt absorption after intramuscular administration may well make this the parenteral route of choice.

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The warfarin sodium for intramuscular injection used in this study was supplied as Coumadin sodium by Dr. Samuel M. Gordon, director of research, Endo Laboratories, Inc., Richmond Hill, N. Y.

We are indebted to Mr. Neil R. Stasilli of Warner-Chilcott Laboratories for assistance in the statistical evaluation of the data.

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CLINICAL OBSERVATIONS ON USE OF WARFARIN (COUMADIN) SODIUM, A NEW ANTICOAGULANT

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Eighty-five male patients with acute myocardial infarction, pulmonary infraction, congestive heart failure, phlebitis, and cerebral and peripheral emboli were treated with warfarin to observe the clinical effects and the results of long-term therapy. The effect of warfarin was evaluated in terms of both "optimal" and "suboptimal" prothrombin depression (2 to 2½ times and 1½ to 2 times of control respectively). Warfarin is the only available anticoagulant which is clinically administered in terms of milligrams per kilogram of body weight. Administration of 0.75 to 1 mg. per kilogram induces a prompt therapeutic hypothrombinemia in the vast majority of patients. The maintenance effects of warfarin, observed in half of the patients for more than four weeks, are relatively predictable, consistent, and safe.

Anticoagulant therapy represents an important advance in the medical management of thrombotic or thromboembolic disorders. Its usefulness in the management of myocardial infarction is being increasingly recognized. The introduction of the orally effective bishydroxycoumarin (Dicumarol) 15 years ago led to an extensive literature, which need not be reviewed here. The prospect for the usefulness of an "ideal" anticoagulant is well stated by Goodman and Gilman,[1] who state that an ideal anticoagulant drug would "greatly extend the field of usefulness of anticoagulant therapy (for short and long term therapy) and thereby exert a salutary effect on the grave social and economic implications of thromboembolic disorders."

Heparin and bishydroxycoumarin have remained the most widely used anticoagulants in spite of their shortcomings. Heparin is costly and requires parenteral administration. Bishydroxycoumarin is inexpensive, but the slow onset of action and excretion make therapeutic levels difficult to control, even with the most careful laboratory control of the therapy. The need for a more nearly ideal anticoagulant has led to extensive pharmacological and clinical investigation of synthetic compounds belonging, in the main, to the coumarin and indandione series. Clinical observations have been reported for ethyl biscoumacetate (Tromexan ethyl acetate), cyclocumarol (Cumopyran), 3-(1′-phenylpropyl)-4-hydroxycoumarin (phenprocoumon, Marcoumar), and warfarin (Coumadin) sodium, which are derivatives of coumarin, and with phenindione (Hedulin, Danilone) and diphenadione (Dipaxin), which belong to the indandione group.

Of these, warfarin, one of a large number of coumarins, synthesized by Link,[2] the discoverer of bishydroxycoumarin, appeared particularly promising on the basis of its unique properties and the early clinical reports.[3] Warfarin, although related to bishydroxycoumarin (fig. 1) in its chemical structure, is highly soluble in water, in contrast to bishydroxycoumarin. This unique property led to its intravenous, intramuscular, rectal,[4] and oral administration. Compared to bishydroxycoumarin, it is relatively more potent in that smaller doses induce an earlier onset of hypoprothrombinemic effect and smaller maintenance doses are needed to provide a stable level of hypoprothrombinemia.

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Clinical trials of this new anticoagulant were stimulated after its potency and relative safety became evident from a suicidal attempt with this drug.[5] This was followed by several clinical reports attesting favorably to the clinical value of this drug.[6] These reports stress, particularly, the prompt initial hypoprothrombinemic effect obtained with both oral and intravenous administration of a usual dose of 1 mg. per kilogram of body weight; infrequent occurrence of hemorrhage, even with excessive prothrombin-depressing reaction; and the prompt counteraction of excessive hypoprothrombinemia after use of moderate doses of phytonadione (vitamin K_1). We felt, however, that it would be desirable to secure additional observations of the reported ability of this anticoagulant to initiate and maintain an adequate and predictable prolongation of the prothrombin time over a greater period of time than that reported in the original papers. The purpose of this paper is to report on our observations on 85 patients treated with warfarin for relatively long periods.

Method

The 85 male patients who form the material of this study represent consecutive admissions to the cardiovascular section of the Brooklyn Veterans

Administration Hospital. They ranged in age from 32 to 80 years. They received the anticoagulant treatment for acute myocardial infarction (78), pulmonary infarction (2), congestive heart failure (2), phlebitis (1), cerebral embolus (1), and periph-

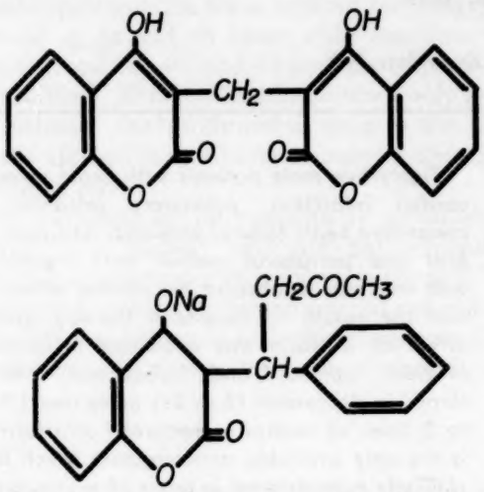

Fig. 1.—Structural formulas for, *top*, bishydroxycoumarin (Dicumarol) and, *bottom*, warfarin (Coumadin) sodium.

eral embolus (1). The patients with myocardial infarction selected for anticoagulant therapy were "bad-risk" cases in accordance with the criteria suggested by Russek.[7] Warfarin was initially available in 25-mg. scored tablets which were halved or quartered to make doses of 12.5 and 6.25 mg. Subsequently 10-mg. and 5-mg. scored tablets were provided, which simplified administration of smaller maintenance doses. An initial dose for patients weighing up to 75 kg. (165 lb.) was 1 mg. per kilogram of body weight. Heavier patients, usually those above 90 kg. (200 lb.), were given 100 to 150 mg. of warfarin during the first 24 hours.

In the presence of suspected hypoprothrombinemia, probable sensitivity to anticoagulants, or bleeding diathesis, the initial dose was often lowered to about 0.75 mg. per kilogram. It was decreased considerably also if congestive heart failure was marked or if hepatic or renal disease was present or suspected. Wherever possible, prothrombin determinations were obtained before the first initial dose of the drug was administered. However, many patients were seen after the usual laboratory hours when initial prothrombin time could not be obtained. Hence, to minimize excessive prothrombin depression the estimated first 24-hour dose was administered in our early trials in two portions with a 3:1 or 2:1 ratio and an 18-hour to 24-hour interval between the two doses. As we gained experience, the initial dose was given at one time.

Warfarin was administered to the patient between 6 and 8 p. m. after availability of the report of the prothrombin time. Prothrombin determinations were done daily on blood drawn at 9 a. m. and carried out on whole plasma by the one-stage method of Quick,[8] with use of thromboplastin (Simplastin). The thromboplastin preparation used during the period of this study proved to be stable. Control prothrombin times were uniformly 13 seconds. Prothrombin results were reported by the laboratory both in seconds and per cent. For this report, the prothrombin time in seconds has been used.

Attempts were made to achieve and maintain an extension of prothrombin times to 2 to 2½ times the control, or 26 to 40 seconds. We designate these times as the "optimal prothrombin time." Prothrombin times of 1½ to 2 times the control, or 20 to 25 seconds, were considered "suboptimal."

A special consideration of this category was prompted by our experience and that of others[9] that such "suboptimal" prothrombin depression may afford significant protection against thromboembolic episodes in certain conditions, such as congestive heart failure. Values of 41 seconds and above were considered excessive. Patients whose prothrombin time reached an optimal level after the initial dose of warfarin were usually given the recommended maintenance dose of 5 to 10 mg., depending upon the prothrombin time response noted and the patient's condition.

Observations

Initial Therapy.—Table 1 reviews the initial response to warfarin in 78 patients of a total of 85. The results in 7 patients were discarded due to initial use of bishydroxycoumarin. At the end of 48 hours, or 36 to 48 hours after administration of warfarin, 46% of the patients had attained sub-optimal prothrombin levels. Most of these patients fall in the group receiving the lower dosage. Optimal levels were obtained in 35 patients, or 45%, by 36 to 48 hours. Thus a total of 71 patients, or 91%, exhibited a prothrombin time prolongation of not less than 1½ times the control value within 48

TABLE 1.—*Initial Response to Warfarin (Coumadin) Sodium in Seventy-eight Patients*

Total Initial Dose, Mg.*	Patients, Total No.	Patients with SOPT† in 48 Hr.		Patients with OPT† in					
				12-24 Hr.		36-48 Hr.		60-72 Hr.‡	
		No.	%	No.	%	No.	%	No.	%
20-39	2	1	50	1	50	...	...	...	...
40-49	2	...	...	...	...	2	100	...	...
50-59	19	10	53	2	10.5	7	37	7	37
60-69	7	4	52	...	...	2§	28	2	28
70-79	28	14	50	1	3.5	12§	43	10	36
80-95	8	3	37	1	12.5	4	50	2	25
100-105	12	4	33	...	...	8	67	1	8.3
Total	78	36	46.2	5	6.4	35	45	22	28.2

* Over 24-hour period; for explanation of divided administration see text.
† SOPT = supoptimal prothrombin time; OPT = optimal prothrombin time.
‡ Some of these patients showed SOPT's during preceding period.
§ Two additional patients showed excessive prothrombin times of over 41 seconds (see text).

hours. This is a degree of prothrombin depression considered by many to be therapeutically adequate. In two additional patients excessive levels were reached in 48 hours on a dosage of 60 and 75 mg. respectively. One rapidly returned to an optimal level with intraveous administration of 15 mg. of phytonadione. The second patient did so without phytonadione administration. Twenty-two patients, or 28%, reached optimal levels by 60 to 72 hours, having shown only suboptimal or below suboptimal levels in the preceding periods. Thus by the end of the third day a total of 57 patients, or 73%, had reached optimal levels of prothrombin time on warfarin therapy.

As regards the effect of the size of the initial dosage upon the frequency and promptness with which initial therapeutic levels are reached, the various dosage groups are too disparate in size to permit conclusions of decisive statistical significance. However, there is a definite trend for larger initial dosages to be associated with earlier therapeutic levels of the prothrombin time. This is particularly well demonstrated for the responses to the higher dosages during the 36 to 48 hour period (table 1).

Our experience with warfarin is in essential agreement with that recorded by others.[10] A comparison of the initial efficacy of warfarin with that of other anticoagulants reveals that, while warfarin does not produce its effect as rapidly as heparin, it is able to initiate desirable therapeutic levels more rapidly and with greater regularity than diphenadione [11] and phenindione.[12] Safe but adequate therapeutic levels may be achieved with warfarin in 48 to 72 hours in over 73% of the patients.

A comparison with bishydroxycoumarin would be very desirable, since this drug is still so widely used, but a detailed comparison is made difficult by the great differences in the manner of administration. It is nevertheless quite evident from the data in Wright's comprehensive series [9] that only a small percentage of patients receiving the established dosage of 300, 200, and 100 mg. of bishydroxycoumarin on three successive days showed prompt and optimal prothrombin depression. Only 12% showed it by the second and only 41% by the third day. The importance of inducing an early optimal therapeutic range is suggested strongly by the recent report of Lee and O'Neal.[13] These workers conclude from a study of autopsy data that anticoagulant therapy to be effective must be initiated at not more than three days from the first sign of a myocardial infarction.

Our later experience with the drug led to the conclusion that if the recommended dose of 1 mg. of warfarin per kilogram had been used consistently in our series, we would in all likelihood have obtained optimal levels of prothrombin time in 48 hours in a higher percentage of our patients. This dosage is usually safe provided that an initial prothrombin time determination is done and impaired renal or hepatic function is ruled out. In those cases in which the initial prothrombin time was not available, we found it desirable to give the total daily dose in two portions, even though the maximum hypoprothrombinemic effect might be delayed. The earlier reports of a more rapid appearance of therapeutic hypoprothrombinemia were based on a single optimum dose of 1 mg. per kilogram. The precaution taken by us was designed to obviate an excessive response, such as may occur in the presence of congestive failure. Our experience, nevertheless, suggests that an excessive hypoprothrombinemia is usually not associated with any gross bleeding. This point will be discussed below.

Heparin was used during the first 24-hour period when the need for therapeutic anticoagulation within a few hours appeared urgent. However, the rapid attainment of therapeutic suboptimal and optimal prothrombin levels with warfarin in a high percentage of cases (97% in 36 to 48 hours) made it possible to discontinue the heparin administration by the second day.

Maintenance Therapy.—We felt it desirable to obtain more information on prolonged maintenance therapy with a continuous dosage schedule than was available from the previous reports. Where feasible, patients were kept on maintenance therapy for longer than the usual period of four weeks after the acute thromboembolic episode. Observations dealing with the use of warfarin for protracted anticoagulation after discharge from the hospital are still in progress.

Tables 2 and 3 list observations on 79 hospitalized patients maintained with warfarin for a total of 2,158 days. Five patients (6.3%) were on maintenance therapy for 11 to 14 days, 18 (22.8%) for 15 to 21 days, 23 (29.5%) for 22 to 28 days, and 33 (41.8%) for over 28 days. Five patients were eliminated from this series because of treatment for less than 10 days. One additional patient was eliminated when the warfarin administration was interrupted for three days because of unavailability of the drug: phenindione was used instead. It may be mentioned here that such interchange with phenindione or bishydroxycoumarin was accomplished readily without ensuing "escapes" from therapeutic levels.

The number of maintenance days ranged from 11 to 55. The great majority of patients (70%) were observed for periods of three to six weeks. Only about 6% of patients were followed for from 11 to 14 days. Optimal prothrombin depression occurred on 54% of the total maintenance days, while suboptimal levels occurred on 37% (table 2). Only

2.4% exhibited prothrombin times exceeding 40 seconds, and of these very few were over 50 seconds. Thus, a total of 94% of all maintenance days were characterized by a prothrombin depression of 20 seconds or more. Expressed in a different manner, total "escape" occurred only in 6% of all maintenance days. This figure is in close concordance with that reported by Nicholson for a shorter period of therapy.[14]

TABLE 2.—*Maintenance Days and Hemorrhagic Manifestations at Various Prothrombin Time Levels*

Prothrombin Times	Maintenance Days No.	Maintenance Days %	Hemorrhagic Manifestations
Below 20 sec.	136	6.3	None
Suboptimal (20-25 sec.)	807	37.4	None
Optimal (26-40 sec.)	1,164	54.0	1 (bleeding gums)
Excessive (41-60 sec.)	51	2.4	1 (epistaxis) 1 (microscopic hematuria)
Total	2,158		

Table 3 lists the maintenance dose requirements of 79 patients over a period of 2,158 patient-days. The variety of doses recorded reflects the change in tablet size available at different times. For the purpose of simplification, doses varying little from each other were combined. On over 50% of the maintenance days the patients required 5 to 15 mg. of warfarin for the daily maintenance of optimal prothrombin depression. There is a fairly even distribution of dosage within this range of doses, with the 9 to 10 mg. group having the most maintenance days. This is in agreement with other reports in the literature.[13] On 17% of the maintenance days there was need for doses larger than 15 mg. to meet our criteria for optimal maintenance. On 10% of the maintenance days the therapy was temporarily discontinued. This occurred when the prothrombin time was at the higher levels or outside of the therapeutic range.

TABLE 3.—*Warfarin Dosage and Maintenance Days Related to Therapeutic Levels of Prothrombin Times*

Dose, Mg.	Maintenance Days No.	Maintenance Days % of Total	Maintenance Days at Therapeutic Levels SOPT* No.	SOPT* %	OPT* No.	OPT* %
2.5-3	38	1.8	7	0.3	31	1.4
5	273	12.6	43	2.0	221	10.2
6-7.5	303	14.0	73	3.4	217	10.0
9-10	429	19.8	163	7.5	248	11.4
12.5	264	12.4	105	4.8	131	6.1
15	237	11.0	132	6.1	89	4.1
17-18	116	5.4	59	2.7	31	1.4
20	118	5.5	72	3.3	28	1.3
25	124	5.7	68	3.1	15	0.7
30	19	0.9	8	0.3	1	0.05
35	3	0.1	2	0.1	1	0.05
40	4	0.1	...	...	...	...
None	224	10.0	...	...	32	1.4
Total	2,158					

* SOPT=suboptimal prothrombin time; OPT=optimal prothrombin time.

Figure 2 illustrates the relationship between optimal and suboptimal days and the various dosages administered. Most optimal days occurred at the 5-to-12-mg. dose. The highest number of suboptimal days occurred when the daily dose was above 15 mg. Only a few patients required maintenance doses of 20 mg. or greater for any appreciable length of time. The higher doses of warfarin were necessary to correct prothrombin times that were slow in rising or to correct "escapes" to suboptimal levels.

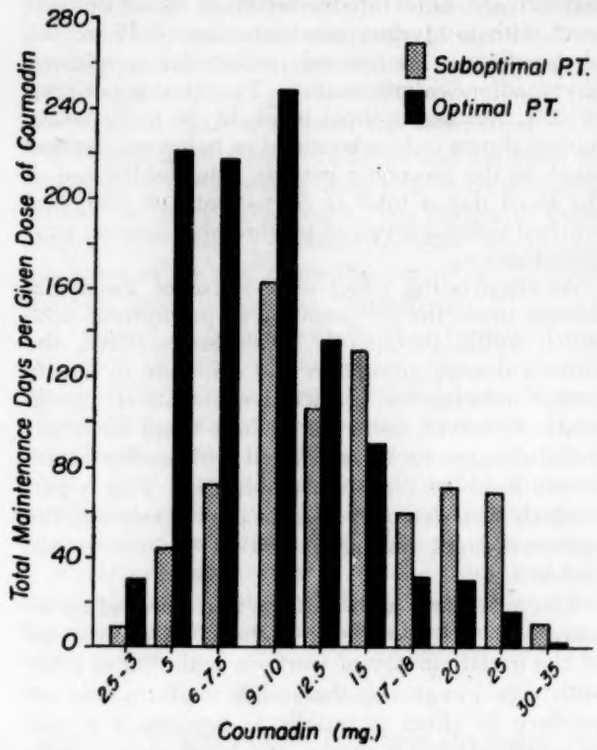

Fig. 2.—Relationship between days on which there were optimal and suboptimal prothrombin times and dosage of warfarin (Coumadin).

TABLE 4.—*Response to Warfarin in Terms of Maintenance Days per Patient*

Prothrombin Level	% of Total Maintenance Days per Patient	Patients, No.	% of Total Patients
Optimal	<25	4	5.1
	25-50	28	35.4
	50-75	41	51.8
	>75	6	7.6
Total		79	
Suboptimal	<25	18	22.8
	25-50	52	65.7
	50-75	8	10.1
	>75	1	1.3
Total		79	

Table 4 demonstrates the response to warfarin in terms of maintenance days per patient. It can be seen that about 60% of the patients showed an optimal prothrombin time prolongation during more than half of their entire period of maintenance with

warfarin. In evaluating this one must keep in mind that this maintenance period includes the early adjustment period of nearly two weeks in which frequent fluctuations of prothrombin response are to be expected in most patients. If the suboptimal prothrombin depression is also taken into consideration it appears that about 71% of all patients experienced therapeutic anticoagulation during more than half of the entire maintenance period.

Comment

A comparison of our data on the maintenance effect of warfarin with those reported for bishydroxycoumarin appears very favorable. This is particularly apparent when the lack of marked fluctuations of prothrombin times noted in our series is considered. The ability to maintain a patient on a given dosage and to avoid frequent "escapes" depends basically upon the inherent characteristics of the anticoagulant used. The ability of warfarin to provide long periods of stable levels of hypoprothrombinemia for any single patient makes it superior to bishydroxycoumarin, ethyl biscoumacetate, and the indandione preparations available, as judged by previous personal experience and that recorded by others.[16] Marked fluctuations of prothrombin levels occur, often secondary to overcautious reduction of the dose when prothrombin times are noted to pass the 30-second mark. This hasty reduction should not be necessary with a drug such as warfarin in view of the excellent tolerance to even excessive doses.

Another cause for undesirable fluctuation of the prothrombin time arising from alterations of the dosage may be related to the time relationship of prothrombin time determination and dosage administration. Prothrombin determinations are usually done at 24-hour intervals during the acute thrombotic episode. These frequent determinations are done to ascertain if anticoagulation is adequate, with respect to the therapeutic range, and to guard against the probable occurrence of hemorrhage from a dose to be subsequently administered. The nature of compounds such as bishydroxycoumarin and biscoumacetate, for example, necessitates rigid control, as assessed by prothrombin time. The anticoagulant effect of any single dose of bishydroxycoumarin is not fully manifested in the 24-hour period following its administration. In the case of biscoumacetate, extremely marked fluctuations in prothrombin time occur within any 24-hour period.

In the case of warfarin, we found that administration of the drug two to three hours after the prothrombin time is determined allowed for a maximal achievement of the effect before the next prothrombin time is done and the succeeding dose is given. The adoption of this time schedule led after a few initial trials to the successful administration of daily doses which not only proved safe but yielded consistent therapeutic effects with little overshooting and little "escape."

We did not encounter any toxic side-reactions after use of warfarin. As regards excessive actions of the drug, we were impressed with the paucity of gross and microscopic hemorrhagic phenomena. Gross bleeding occurred in only two patients. One patient had a brief epistaxis on his 20th treatment day. This was not associated with a marked hypoprothrombinemia and did not interfere with continuation of warfarin therapy. A second patient had bleeding gums for three days, with a prothrombin time of 26 seconds, and warfarin therapy was continued. Microscopic hematuria was searched for in patients with excessive prothrombin depression and was found in only one patient. The few patients exhibiting excessive prothrombin depression responded readily to phytonadione in doses of 15 to 30 mg. In contrast to those receiving bishydroxycoumarin, they did not show subsequent refractoriness or an unduly delayed response to reinduction of warfarin therapy. Some patients in whom phytonadione was temporarily withheld did not bleed, in spite of excessive prothrombin time levels.

Four deaths occurred while patients were undergoing anticoagulant therapy. These deaths could not be related to this therapy. Three patients died one, three, and four weeks, respectively, after acute myocardial infarctions with the clinical picture of recurrent acute coronary occlusion or insufficiency. One patient with repeated myocardial infarctions developed a third one while on prolonged anticoagulant treatment and died shortly after admission in severe shock. This low mortality from myocardial infarction (5%) in a bad-risk group of patients is striking, but a discussion of its significance in relation to anticoagulant therapy is not within the scope of this report.

We have not encountered a single proved instance of an acute thromboembolic episode subsequent to the initiation of therapy. This is rather striking, even in this small group of patients. It suggests the protective benefit derived from administration of the anticoagulant, even in those cases where only suboptimal prothrombin depression was obtained.

Illustrative Cases

The following examples of therapy and the figures based on them have been selected to illustrate some of the extremes in prothrombin time response and also various effects of the type of management.

Figure 3 demonstrates a slightly excessive response to the initial single dose of warfarin and an erratic response to subsequent small doses of this drug. It is to be noted that this was limited to the early period of anticoagulant therapy and that the over-all response did not drop below the suboptimal

range. Also, the marked sensitivity of this patient to the anticoagulant decreased later on as his congestive failure subsided. Figure 4 illustrates an instance of extreme sensitivity to an average maintenance dose of warfarin, again occurring during the

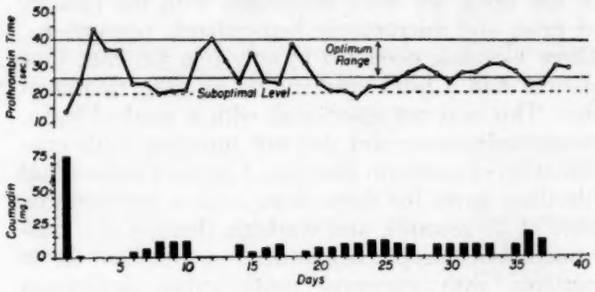

Fig. 3.—Slightly excessive response to initial single dose of warfarin (Coumadin) and erratic response to subsequent doses during early period of anticoagulant therapy.

early phase of anticoagulant therapy. It is to be noted that the excessive prothrombin depression subsided without the administration of phytonadione (vitamin K_1) oxide. The latter was withheld in the absence of significant hemorrhagic manifestations and in view of the threat of recurrent pulmonary infarction posed by the persistence of congestive heart failure. Figure 4 also illustrates the desirability of maintaining a stable maintenance dose after the initial period of adjustment. Premature marked reduction of the dose results in fluctuation of the prothrombin times in and out of the optimal range.

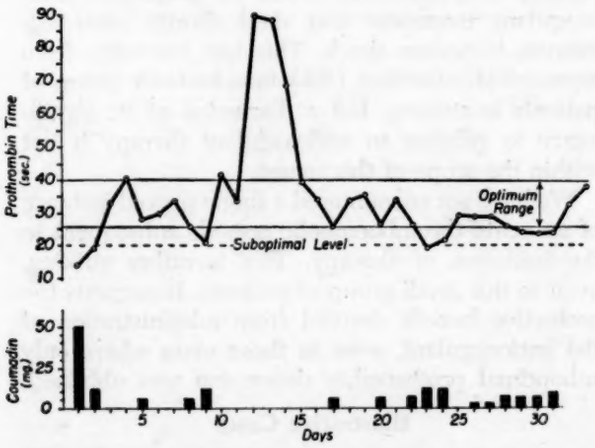

Fig. 4.—Instance of extreme sensitivity to average maintenance dose of warfarin (Coumadin) during early phase of anticoagulant therapy.

Figure 5 illustrates the course of a patient showing good response to initial administration of warfarin and good handling subsequently. The patient's prothrombin time remained in the optimal therapeutic range on stable maintenance with 7.5 mg. of warfarin for nine days. The initial period needed to reach the optimum range might have been shortened had a larger dose of the drug been given initially, but an initial prothrombin time was not available.

Figure 6 illustrates the course of a patient exhibiting a slow initial response to warfarin. A week was needed to achieve an optimal depression of prothrombin. This patient required unusually large amounts of warfarin. Probably 15 to 18 mg. would have been an adequate maintenance dose. Varying the dose frequently made for swings in and out of the optimal therapeutic range. Consequently a greater number of days show "escape." This experience suggests that the optimal individual requirements for warfarin can be best obtained by slight incremental changes of dose.

Figure 7 illustrates the course of a patient over six weeks. The initial period shows overshooting following an excessive dose with a return to better levels in two days. Subsequently, attempts to

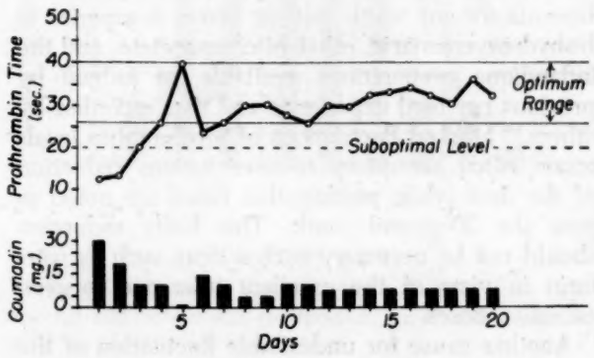

Fig. 5.—Good initial response to warfarin (Coumadin) and good subsequent handling.

achieve a stabilizing dose required many days of observation. Days 28 to 44 illustrate a period when 7.5 mg. of warfarin was being given daily. Days 30 to 32 show a slight dip below the optimum prothrombin time. On the same dose, we then note a gradual climb to 40 seconds prothrombin time. At this time, the dose was decreased to 5 mg. and the prothrombin time returned to lower satisfactory levels.

A few patients observed with similar stable maintenance periods have also had single days where the prothrombin time climbed to excessive levels after a period of consistent stability. Thus fluctuation in response may occur not only in the early days of treatment but also in the subsequent days. In most cases, however, patients show a stable response to warfarin in their later days of treatment.

Summary and Conclusions

Our observations on the clinical efficacy of warfarin (Coumadin) sodium as an anticoagulant leads us to believe that we have in warfarin a drug that

comes closer than the others now available to fulfilling the criteria [1] of an ideal anticoagulant. Our experience with its use in 85 patients for a total of 2,158 maintenance days has demonstrated the following facts:

Warfarin induces a fairly prompt therapeutic hypoprothrombinemia in the vast majority of patients. Optimal prothrombin time values of 25 to 40 seconds (or 2 to 3 times the control) were obtained within 36 to 48 hours in 45% of the patients and suboptimal values of 20 to 25 seconds (or 1½ times the control) in an additional 46%. Thus an apparently protective prothrombin depression was obtained within 36 to 48 hours in 91% of the patients. Optimal prothrombin time values of 25 to 40 seconds within 72 hours were obtained in 73% of the patients. If heparin administration is considered necessary for particularly rapid initial anticoagulation, it need rarely be continued for more than 18 to 24 hours.

Warfarin produces relatively well-predictable and consistent maintenance effects with infrequent total "escape" on a continuous dosage regimen. Therapeutic (optimal and suboptimal) prothrombin depression was obtainable on 93% of all maintenance days, with escape to less than 20 seconds with respect to our normal of 13 seconds on only 6% of the days. The maintenance period extended beyond four weeks in 42% of the patients.

Warfarin yields these consistent effects with relatively slight alterations of dosage. The previously recommended initial dosage of 1 mg. per. kilogram of body weight appears optimum and should, whenever possible, be administered as a single undivided dose unless there is serious indication

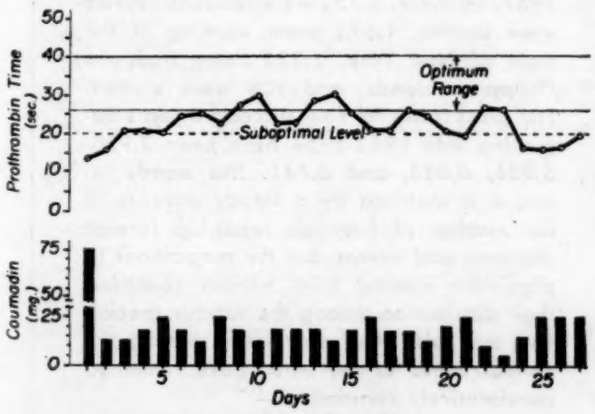

Fig. 6.—Slow initial response to warfarin (Coumadin).

to modify this dosage. We have found little need for excessive manipulations of the dosage during the maintenance period, after allowance has been made for the early adjustment period. The majority of patients can be well maintained in the therapeutic range with a daily dosage of 5 to 15 mg. with an average of 10 mg. per day. We have found it useful to administer the daily dose of warfarin within two to three hours after determination of the prothrombin time. Such a scheme avoids excessive responses and secondary prothrombin

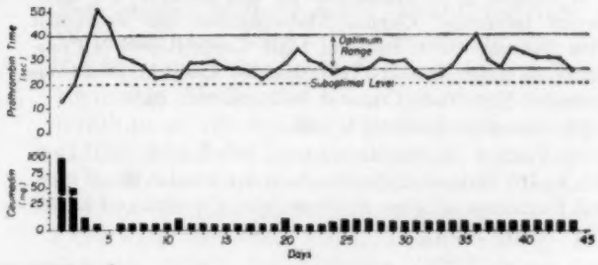

Fig. 7.—Overshooting in initial period due to excessive dosage of warfarin (Coumadin), with stabilization in two days.

changes, since each prothrombin determination may in effect be an accurate guide to the effect of a previous dose.

Warfarin rarely causes excessive prothrombin depression of a serious nature. We encountered, in our series, only two instances of clinically manifest hemorrhage, both of minor significance, and one instance of microscopic hematuria. Excessive prothrombin depression is quickly counteracted by moderate doses of phytonadione (vitamin K_1). Warfarin produces no known systemic toxic effects. We, therefore, consider warfarin clinically a highly useful drug for both initial and long-term anticoagulant therapy.

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FOREIGN INTERNS AND RESIDENTS IN THE UNITED STATES, 1956-1957

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and

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A total of 6,741 foreign physicians from 88 countries were reported as interns or residents during a survey of 1,242 hospitals of the United States during the year 1956-1957. Of these, 4,753 were residents, 1,988 were interns, 1,673 were working in the state of New York, 1,332 came from the Philippine Islands, and 908 were women. The gross totals for four successive years beginning with 1953-1954 have been 2,920; 5,036; 6,033; and 6,741. This steady increase is matched by a steady increase in the number of hospitals reporting foreign residents and interns, but the proportions of physicians coming from various countries, their distribution among the various specialties, and also their distribution among the various states of the union have remained comparatively constant.

The continued interest of hospital administrators and the medical profession in the subject of the training of foreign physicians in this country is evidenced by the fine response to questionnaires dealing with this part of our medical population. The efforts being made to assure the proper selection and adequate training of these foreign physicians emphasize the importance of such current information as number, origin, and location of foreign interns and residents on the house staffs of hospitals in the United States.

Survey Methods

The 1956-1957 survey of foreign interns and residents in training in hospitals in the United States, conducted by the Institute of International Education with the cooperation of the American Medical Association, was distributed in September, 1956, to the 1,323 hospitals listed by the Council on Medical Education and Hospitals as approved for internships and/or residencies. The individual survey questionnaires specified that only interns and residents who had both foreign citizenship and permanent residence in a foreign country should be reported and that persons in the following categories should not be included: those from Alaska, the Hawaiian Islands, Puerto Rico, the Virgin Islands, Guam, or other United States territories; displaced persons resettled permanently in the United States; and foreign citizens who have immigrated to the United States for permanent residence. The original mailing

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in September and a follow-up letter in December brought forth replies from a total of 1,242 hospitals (93.9% of all the hospitals polled); 797 hospitals reported foreign interns or residents, 445 replied in the negative, and only 81 hospitals did not reply.

TABLE 1.—*Foreign Physicians Training in Approved Hospitals in the United States, 1956-1957, by States and Territories*

Location of Hospitals	Physicians, Total No.
Alabama	15
Arizona	46
Arkansas	7
California	84
Colorado	84
Connecticut	137
Delaware	19
District of Columbia	162
Florida	67
Georgia	84
Idaho*	...
Illinois	519
Indiana	19
Iowa	57
Kansas	51
Kentucky	93
Louisiana	24
Maine	13
Maryland	281
Massachusetts	438
Michigan	277
Minnesota	131
Mississippi	1
Missouri	303
Montana	10
Nebraska	2
Nevada*	...
New Hampshire	0
New Jersey	399
New Mexico	2
New York	1,673
North Carolina	56
North Dakota	9
Ohio	532
Oklahoma	16
Oregon	26
Pennsylvania	437
Rhode Island	38
South Carolina	7
South Dakota	9
Tennessee	68
Texas	189
Utah	22
Vermont	14
Virginia	89
Washington	37
West Virginia	81
Wisconsin	72
Wyoming*	...
Alaska*	...
Canal Zone	0
Guam*	...
Hawaii	39
Puerto Rico	2
Total	6,741

* No hospitals were polled in these states.

Results

Gross Totals.—In all, a total of 6,741 foreign physicians from 88 countries were reported as interns or residents in this country in 1956-1957. The majority were residents (4,753); less than 30% (1,988) were interns. Only 908 of the total reported were women, and over 60% of these female physicians were from the Far East (376 from the Philippine Islands alone).

Distribution.—Table 1 shows that these foreign physicians were reported at hospitals in 44 states, the District of Columbia, Hawaii, and Puerto Rico. Four states (Idaho, Nevada, New Hampshire, and Wyoming) and Alaska, the Canal Zone, and Guam did not report any; of these areas, Idaho, Nevada, Wyoming, Alaska, and Guam have no approved internships or residencies. Approximately one-fourth (1,673) of all the foreign physicians were reported to be in New York state. Hospitals in 11 other states and the District of Columbia reported a total of more than 100: Ohio (532), Illinois (519), Massachusetts (438), Pennsylvania (437), New Jersey (399), Missouri (303), Maryland (281), Michigan (277), Texas (189), the District of Columbia (162), Connecticut (137), and Minnesota (131).

Origin.—As shown in table 2, these physicians came from 88 countries. Over one-third (2,293) came from Far Eastern countries; Latin America (1,487) and Europe (1,451) were each the origin of over one-fifth of the physicians, and more than one-eighth of the total (822) were from the Near and Middle East.

Fields of Study.—The foreign residents were reported to be in 31 different specialties or fields of study. Over a hundred residents were reported to be in each of the following 11 specialties: general surgery (985), general medicine (707), obstetrics and gynecology (408), pathology (399), pediatrics (369), psychiatry (332), internal medicine (294), anesthesiology (248), radiology (214), urology (117), and orthopedics (104).

Survey Trends

This year's survey of foreign interns and residents is the fourth annual tally of the foreign medical population in this country conducted by the Institute of International Education.[1] A most significant trend, and one which must be considered in evaluating the results of these surveys, is the ever-increasing number of hospitals which reply: 769 hospitals replied to the 1953-1954 survey; 1,177 (or 90% of those surveyed) replied in 1954-1955; 1,235 (93%) replied in 1955-1956; and 1,242 (93.9%) replied in 1956-1957. The gross totals of foreign interns and residents in training for these four surveys were, in order: 2,920; 5,036; 6,033; and 6,741. It is evident that the results of the first survey should not be taken too seriously, and that its major role was of an exploratory and experimental nature.

The most striking fact evident from these surveys is the interyear similarity. In every year there have been slightly more than twice as many foreign residents as interns, but this ratio is the same as that of total approved residencies to internships. Each of the four annual tallies shows the largest group of these physicians in New York and Ohio; Illinois,

Massachusetts, Pennsylvania, and New Jersey have held their places in the top six states in all four surveys; Missouri has been seventh for the last three years; and Maryland and Michigan were eighth and ninth for the last two years. The three countries which were the origin of the greatest numbers of foreign physicians this year (the Philippine Islands, Canada, and Mexico) have topped the lists for the past four years; Turkey, in fourth place in 1956-1957, was fifth on the three previous lists; and Germany, in fifth place in 1956-1957, was fourth on the previous lists. The results of the last three surveys show that the largest number of foreign residents specialize in either general surgery, general medicine, or obstetrics and gynecology; the next five specialties (pathology, pediatrics, psychiatry, internal medicine, and anesthesiology) have followed the top three, in varying order, for the last three years.

TABLE 2.—*Foreign Physicians Training in Approved Hospitals in the United States, 1956-1957, by Place of Origin*

Location of Hospitals	Physicians, Total No.	Location of Hospitals	Physicians, Total No.
Argentina	139	Italy	242
Australia	26	Jamaica	10
Austria	41	Japan	253
Belgium	22	Jordan	11
Bolivia	11	Kenya	1
Brazil	96	Korea	296
British Borneo	1	Lebanon	75
British Guiana	4	Liberia	2
British Honduras	1	Luxembourg	3
British West Indies	1	Mexico	556
Bulgaria*	1	Netherlands	72
Burma	4	Netherlands West Indies	1
Canada	576	New Zealand	1
Ceylon	1	Nicaragua	27
Chile	7	Nigeria	4
China†	153	Norway	5
Colombia	107	Pakistan	13
Costa Rica	10	Panama	3
Cuba	180	Paraguay	9
Cyprus	14	Peru	117
Czechoslovakia*	1	Philippine Islands	1,382
Denmark	7	Poland*	3
Dominican Republic	76	Portugal	23
Ecuador	28	Romania*	1
Egypt	47	Saar	1
El Salvador	7	Saudi Arabia	1
Federation of Malaya	3	Southern Rhodesia	2
Finland	1	Spain	127
France	28	Spanish Morocco	2
French Morocco	2	Sudan	2
Germany	324	Surinam	1
Ghana	1	Sweden	6
Gibralter	1	Switzerland	56
Greece	305	Syria	35
Guatemala	19	Thailand	41
Haiti	36	Trinidad and Tobago	11
Honduras	16	Turkey	427
Hungary*	3	Union of South Africa	18
Iceland	7	United Kingdom	103
India	203	Uruguay	1
Indonesia	3	Venezuela	13
Iran	183	Vietnam	3
Iraq	29	Yugoslavia	8
Ireland	60	Stateless	4
Israel	34	Total	6,741

* Physicians from these countries have given home addresses in other countries (not the United States).
† Includes physicians from Taiwan.

Approximately 21% of these students (2,056) were reported to be studying medicine, in 28 different countries. Six hundred sixty-nine of the 996 American students reported in Switzerland, 319 of the 652 in Italy, 293 of the 1,358 in Canada, 174 of the 223 in the Netherlands, and 108 of the 262 in Belgium were reported to be studying medicine.

Other Professional Visitors.—The 1956-1957 surveys of foreign faculty members in the United States and American faculty members abroad, conducted by the Institute of International Education, provide additional information on international exchange in the field of medicine. Of the 1,153 foreign scholars reported in this country, 180 were listed under medicine. Of the 1,492 American scholars abroad, 81 were reported to be doing research or teaching in the field of medicine.

Other Surveys

Americans Studying Medicine Abroad.—The results of the most recent survey of United States citizens studying abroad, conducted by the Institute of International Education, show that 9,887 United States citizens studied in 387 institutions of higher education in 54 countries, in 1955-1956.

622 W. 168th St. (32) (Dr. McCormack).

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CLINICAL NOTES

RAPID METHOD OF DETERMINING URINARY INFECTION

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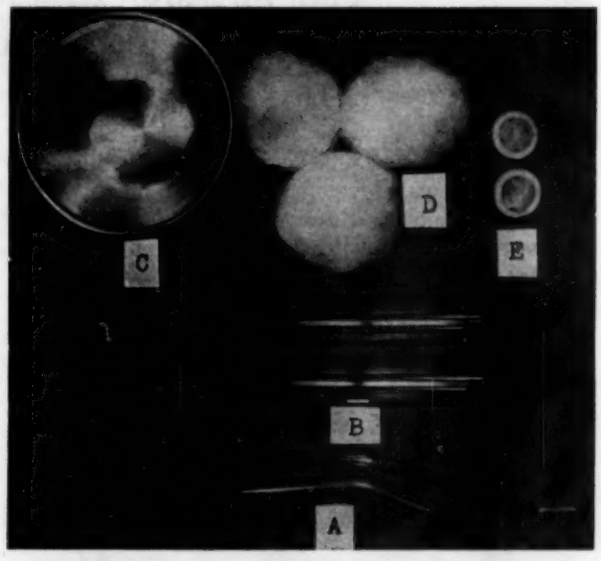
Microscopic examination of the urine is a relatively simple procedure and, when it is performed promptly and properly, can be very informative. In urinary tract infections the physician may depend upon the finding of pus cells and micro-organisms in the urine to aid him in making a diagnosis. Many methods of collecting, examining, and reporting these specimens have been recorded, but it has been our experience that unless the routine outlined is simple and definite, there will be so many sources of contamination that the results may be of little or no value. For example, a urine which has been collected at 6 a. m. and then allowed to stand at room temperature until 11 a. m. or later may show a large number and variety of micro-organisms, even if only a few contaminants were present in the fresh specimen. Hemolysis of red blood cells in urine allowed to stand at room temperature is another complication. Furthermore, a specimen which has been collected by rubber catheter from a woman, after the tip of the catheter has bent away from the meatus once or twice and has been contaminated with vaginal secretions, can hardly be expected to contain pus cells from within the urinary channels only.

To minimize these and other sources of potential error we adopted a method which has given satisfactory results over a period of five years. We claim no originality in any of the techniques. We have simply combined various suggestions from many sources in a simple routine. Perhaps it warrants more widespread trial and adoption.

We have arbitrarily named the procedure urine sterile sediment routine (SSR), and each of the following steps is considered important: In men the specimen is collected after a small amount of urine has been passed (second voided). The patient is instructed to stand if possible, to retract the foreskin, and to void into any container or the lavatory a portion of his bladder contents. While the stream is flowing he (or an orderly) catches a portion "on the fly" in a sterile test tube or centrifuge tube and corks it with a sterile rubber closure.

In women the specimen is obtained by catheterization (see figure). The patient is prepared by draping and the labia are separated and cleansed by washing with aqueous solution of benzalkonium (Zephiran) chloride. A small glass catheter (except in pregnant women past five months) is then inserted into the bladder and the first part of the urine discarded. A sterile tube is moved into the stream "on the fly," and the specimen is collected and corked. Second, all specimens for sterile sediment routine are collected between 8 a. m. and 3 p. m. and sent immediately to the bacteriology laboratory. The specimen must be examined not later than one hour after collection. Third, the specimen is centrifuged and the supernatant fluid discarded. A flamed wire loopful of the sediment is smeared on a glass slide, heat dried, Gram-stained, and examined for organisms and pus cells. A second drop is placed on a slide, covered with a cover glass, and examined for formed elements. Fourth, if more definite identification is desired, the physician asks for cultures and sensitivity tests in addition to the SSR.



Catheterization set for females: *A*, glass catheters, female: 6 by 4 ml., 6 by 5 ml.; *B*, 15 by 125 mm. test tubes with no. 0 rubber stoppers; *C*, 4-oz. iodine cup (used as container for benzalkonium); *D*, cotton balls; and *E*, rubber finger cots. Items are placed in a 4.5 by 8.5 by 3 in. metal dressing pan with cover and sterilized by autoclaving.

We find glass catheters preferable to rubber in catheterizing women for the following reasons: They are cleaner, since the fingers do not touch that portion of the catheter which is inserted into the patient, and the end does not accidentally wipe

From the departments of urology and pathology of the Springfield Hospital and the Wesson Memorial Hospital.

over the vaginal wall; they are less painful and traumatizing, because glass is smoother than rubber; being transparent they are easily cleaned; and they are inexpensive. There is no real danger of breakage, if catheters are used properly.

An ingenious "unitized disposable plastic catheter and specimen container" was recently described.[1] We believe this equipment has two disadvantages. First, it does not allow for discarding the first specimen of urine obtained, and second, we have not yet seen any plastic catheters as smooth as the glass variety. We prefer to use the female catheterization tray illustrated. This is prepared and sterilized in the central supply of the hospital and kept ready on the floors.

We have found, as have others,[2] that a direct smear is more likely to be an accurate index of urinary tract infection than is a culture, as in any method of collection small numbers of contaminant micro-organisms may be introduced. Their growth will be abundant on the ordinary bacteriological mediums and may lead to mistaken diagnosis of infection. To show organisms microscopically they must be present in numbers approximating 100,000 per milliliter of urine. Therefore, if organisms are present in a slide preparation of an adequately collected and promptly examined specimen, they indicate infection and not accidental contamination. The culture is, of course, essential for comparison with the original report and to make sensitivity tests if requested.

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NEW GRASPING HOT CAUTERY ELECTRODE FOR DESTRUCTION OF RECTAL POLYPS

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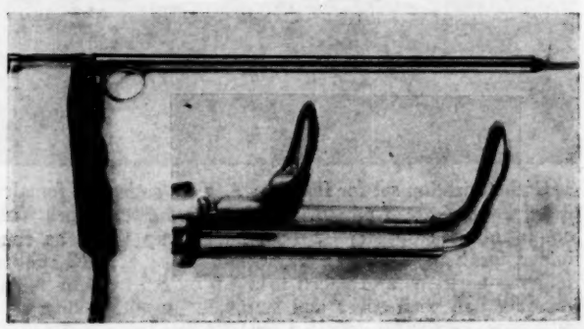
The hot cautery electrode herewith illustrated (see figure) was developed for safer and easier destruction of polyps through a proctoscope. At the present time, surgical diathermy, in spite of fundamental disadvantages, has achieved greater favor for the purpose than has hot cauterization, because of an armamentarium more highly developed for technical convenience.



Hot cautery electrode that grasps rectal polyps.

It is my conviction, both from a theoretical standpoint and from clinical experience, that cold cauterization is far more prone to result in perforation of the intestine than is thermal cauterization. This is particularly so for the occasional operator, although experts report this serious accident in such incidence that its occurrence seems to be almost inevitable in extended proctologic practice. Deep, extensive, and almost instantaneous destruction of tissue is prone to occur with diathermy, because the only guide as to what will happen is an arbitrary setting whose only meaning must be in terms relative to the actual experience of the individual and for a given set of variable conditions.

A hot cautery tip, on the other hand, can reach only a specific temperature before it burns out. An adjustment to "cherry red" or less can be quickly and accurately made by anyone and always means the same thing in terms of the common experience. Also, areas cauterized by the hot cautery method seem to be less subject to secondary hemorrhage than are those areas in which a cold instrument is used. An incidental, though not insignificant, advantage in favor of hot cautery lies in the relative cost of necessary energizing equipment.

A chief deterrent to use of thermal cautery has been the clumsiness of available cautery tips, which have been single bladed affairs without effective means of either making or keeping contact with the polyp to be destroyed. The present instrument is the first that can accurately, firmly, and continuously grasp tissue, either the body or pedicle of pedunculated polyps or the sessile variety. It may be used for repeated mild coagulation or quick thermal destruction and with only a small cautery transformer as necessary additional equipment.

547 E. Union.

MEDICAL EDUCATION in the UNITED STATES and CANADA

FIFTY-SEVENTH ANNUAL REPORT ON MEDICAL EDUCATION IN THE UNITED STATES AND CANADA BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION

Edward L. Turner, M.D., Walter S. Wiggins, M.D., Glen R. Shepherd, M.D., John Hinman, M.D., and Anne Tipner

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ACKNOWLEDGEMENT

The following material constitutes the 57th Annual Report on Medical Education in the United States and Canada, as compiled by the Council on Medical Education and Hospitals of the American Medical Association. It deals specifically with undergraduate medical education, certain facets of postgraduate medical education, and those areas of technical education and training cooperating with the Council. Detailed information regarding postgraduate medical education is presented each year in a separate issue of THE JOURNAL (Aug. 17, 1957). Graduate medical education covering internships, residencies, fellowships, and certain pertinent data regarding the specialty boards is also published in a special issue of THE JOURNAL (Oct. 5, 1957).

The data presented cover the academic year 1956-1957 and have been derived from official sources in all instances. The presentation of this information has been made possible through the cooperation of medical school and university officials, government agencies, and the officers of the technical organization included. The Council on Medical Education and Hospials desires to express its appreciation to those individuals and organizations who have cooperated so effectively in furnishing the information on which this current report is based.

THE CHANGING DIMENSIONS OF MEDICAL SCIENCE AND THEIR IMPLICATION IN MEDICAL EDUCATION

The June 1, 1957, issue of THE JOURNAL presented a group of papers delivered before the 53rd Annual Congress on Medical Education and Licensure (Feb. 11, 1957) highlighting some of the problems and challenges confronting medical education. Those papers, prepared and delivered by Weiskotten,[1] Whitehorn,[2] Atchley,[3] Cope,[4] Wood,[5] and Dempsey[6] merit careful reading and serious study by all individuals interested in and concerned with medical education and medical practice. In fact, they might well be classified in the category of "required reading" on the part of the medical profession at large as well as those engaged specifically in medical education and research. If space permitted, the Council on Medical Education and Hospitals would be pleased to present this group of papers as the introductory background for this annual report.

In presenting his comments on "The Underlying Cause of Unrest in University Medicine," Wood[5] characterizes present-day medicine by its state of intense ferment and the climate of unrest that pervades the profession. Rather than relate this situation to medical economics, group practice, full-time clinical faculties, or the changing pattern of disease, he presents the idea that "the real cause of our present unrest is the rapidly changing dimensions of medical science." These dimensions involve the Euclidean geometric factors of depth, breadth, and length and the Einsteinian fourth dimension of time.

No thinking individual can deny that modern medical education, research, and practice require a depth of knowledge today that was not even dreamed of a relatively short time ago. Modern medicine is not an isolated empirical entity, but borrows to an increasing extent from sciences and humanities on all sides (biology, chemistry, physics, sociology, philosophy, etc.) as its breadth expands. Physicians are not in a position to understand fully their patients without reasonable familiarity with the multitude of possible environmental factors of illness. In fact, medicine has been defined "as a study of the interaction of man and his environment." Wood points out that as depth and breadth of knowledge in medical science has advanced "the most important practical problem confronting medicine today is that created by the excessive length of time required to train a modern physician." Thus he states:

> As the depth and breadth of knowledge in medical science have increased, the combined undergraduate-postgraduate courses [graduate] in medical schools and hospitals have become longer and longer. In this country, physicians and surgeons are considered well qualified to practice only after they have completed 4 years of college, 4 years of medical school, and an additional 3 or more years in a hospital—a total of at least 11 years after high school. When two years of compulsory military training are added, many doctors of medicine have reached the age of 30 before they have finished their formal education. Those interested in research have spent a number of their most promising years merely preparing for their careers. This demanding period of training, with its inevitable economic strain, has become so long that it is beginning to discourage candidates from entering the field of medicine. The relative number of students applying for admission to medical schools, as compared to those applying for training in other professions, has been definitely on the decrease [Stalnaker[7]]. Furthermore, there is good evidence that the excellence of practicing doctors is related, in part at least, to the length and quality of their postgraduate [graduate] training as house officers. Under the present prolonged curriculum of undergraduate medical education, many young physicians are forced, for economic reasons, to enter private practice before they have gained adequate experience in hospital residencies. Such short-cuts to practice, in this age of expanding science, deprive society of the maximal return on its investment in medical manpower.

Depth and breadth of knowledge in medical science as well as in socioeconomic areas impinging upon medicine have increased the length of time involved in adequate preparation for all phases of medical activity. These changing dimensions in medicine present continuing challenges to those engaged in education, research, and practice. In the rapidly changing dynamic setting of medicine in modern society efforts must be continued towards producing, as nearly as possible, the ideal physician to whom Atchley[3] refers. This may be done through the selection of cultivated men and women and then stimulating in them a humanistic response through precept and example, along with providing the opportunity for them to become scientists capable of coping with their evolving discipline through experience gained in "an atmosphere of sound critical thinking in an environment dedicated to advancing the science that is the physician's unique contribution to man's health and happiness."

CURRICULUM PLANNING AND REVISION

Evidence of the increasing attention being given to problems in medical education and practice created by these changing dimensions is not manifested solely by unrest per se but also through the study and educational experimentation currently under way in medical schools throughout the nation. Several examples of the type of study and action being conducted are reported in the following paragraphs.

One of the more recent developments of interest is the proposed revision of the program of medical education at Johns Hopkins University.[8] The faculty of this institution has reviewed the evolution of the American system of medical education and, in light of its experiences, noted the emergence of certain serious defects. The three most important of these are considered to be (1) the excessive number of years required to train a physician, (2) the dichotomy existing between the liberal arts and the

medical sciences, and (3) the noticeable decline of strength that has developed in recent years in the basic science departments of medical schools. The projected Revised Program of the Johns Hopkins University is directed toward counteracting, as far as possible, the three basic shortcomings previously noted.

In brief, the schedules for the first four years of the medical curriculum in this five-year program would be based on an academic year increased from 32 to 40 weeks, and the fifth year, representing a rotating internship in the Johns Hopkins Hospital, would cover an entire calendar (52-week) year. However, in place of the current degree requirement for admission, carefully selected students may be admitted to this five-year program after two years of college. This will make it possible for the talented student to complete the cycle of college–medical school–internship in seven years rather than in the nine years now involved when a college degree is included as an admission requirement. At the same time this Revised Program offers opportunities for other students to enter after either three or the usual four years of college. A liberal education is provided through interdigitation of courses in the humanities and the medical sciences. Basically this Revised Program will (*a*) shorten the course of training by one or two years, (*b*) reduce the total cost of medical education through this time reduction, and (*c*) increase emphasis on creative and independent study. The curriculum is so designed that during the five years the "iron curtain" barrier between liberal arts and medical science will be broken, it is believed, to the mutual advantage of the medical school and of the rest of the university. It should be reflected in elevation of academic standards of premedical courses in the natural sciences and tend to eliminate current unnecessary duplications of effort. The program is designed to offer unusually favorable opportunities for students to engage in research during their formative years in medical school. Social science instruction in the university should improve through enhanced opportunities in the humanistic and sociological problems of medicine.

This program, permitting students selected for early admission to medical school to continue their college education along with the study of medicine, should augment interest and meaning in the significance and values of the liberal arts. In view of the serious thought and discussions of recent years focused on the relative merits of the internship in the medical education center setting, the Johns Hopkins University Revised Program presents one potential solution. In recent years, good undergraduate senior student clerkships have, in many instances, become the equivalent of excellent rotating internships. The requirement of an additional year of internship, rotating or otherwise, has therefore, in some instances become a duplication of effort. Undoubtedly, in some settings the clerkship, because of its careful supervision, has been the more valuable of the two experiences. In the Johns Hopkins University proposal, the fifth-year student would become a rotating intern in the Johns Hopkins Hospital, carrying a 52-week, 24-hour responsibility for patients. This assignment would include a two-month elective period during which the student might choose to undertake special work in basic science or additional clinical training in any one of the various departments in the hospital. Shortening the total cycle of training will permit a larger proportion of graduates to obtain optimal graduate experiences in hospital residencies and may also encourage more individuals to pursue careers in the basic medical sciences. It is anticipated that this full program cannot be put into effect until 1959, as it is dependent upon construction of new basic science facilities.

The Harvard *Medical Alumni Bulletin* for April, 1957,[9] presented a rearrangement of the first two years of the medical course at Harvard Medical School. This is the result of frequent reappraisals of the teaching program and the recommendations of an *ad hoc* committee which conducted its activities during three phases. During the initial phase, the curriculum was analyzed course by course as the committee familiarized itself with the outlook, aims, programs, and problems of each department. Subsequently, the committee worked on the evolution of a course which it believed might represent the optimal educational format for the first two years of medicine. These studies were reported to the faculty early in 1956 and the recommendations were received with considerable enthusiasm. Later, the committee was enlarged to bring about "the broadest possible spectrum of opinion," as the details of implementing the suggested revisions were developed. In February, 1957, the faculty approved in principle the report and recommendations of the *ad hoc* committee.

As has been the experience of others, the committee found the necessity for maintaining a reasonable balance between enthusiasms for a possible new venture and the appreciation of an already proved achievement. The importance of improved interdepartmental communication at all levels, including the younger teachers, was highlighted. The values of appropriate timing in subject matter as well as consideration of the importance of initially offering students contact with the philosophy, methods, and contributions of separate established basic disciplines prior to attempting a unified approach to problems of human biology were carefully studied. Other factors were considered, such as the merits of reduction in didactic teaching in favor of increased free time for students and the encouragement of wider scientific reading, the pros and cons of a broader tutorial system in hastening the orientation of the student and in aiding him to

utilize free time advantageously, the importance of active cooperation among inherently strong individual departments, and the need to envolve a curriculum that preserved time for the faculty to conduct research.

Although the Harvard curriculum rearrangement does not represent a radical departure, it does present an excellent effort to balance effectively the presentation of principles of various disciplines and correlative teaching during the first two years. Its chief objective has been to provide a framework within which the departments can cooperate most successfully in the presentation of subject matter when such cooperation might enhance the presentation. It allows for extreme flexibility, and the Harvard faculty anticipate that there will be a continued evolution of the best ways of presenting the basic medical sciences to their students.

The suggestions and readjustments emanating from the studies being conducted by curriculum and faculty committees in the medical schools vary from modest readjustments to major reorganization, such as has already been indicated in the Johns Hopkins Revised Program. At Baylor University, the curriculum committee has completed a major revision of the second year, effective for 1957-1958, to facilitate extension of the comprehensive method of teaching and examination. This is a continuation of the revision made in the first year program in 1953-1954 centering around concurrent teaching of anatomy, physiology, and biochemistry throughout the year. The success of this earlier correlative effort was felt to lie in better evolution of a student of "medicine," rather than that of a "graduate student." The readjusted second-year program schedules courses to run concurrently throughout the year and replaces the block system whereby some courses are completed prior to the initiation of others.

The so-called block system has had support as well as opposition from teachers and investigators for many years. The difficulties of correlation presented at some stages of medical education through the block system are readily apparent. Prolonged concurrent instruction, although enhancing the potentialities of interdepartmental correlation, may on the other hand be less economical from the standpoint of faculty teaching and research time. Medical schools will be interested in further reports on this readjusted program after sufficient time elapses to permit its comparative analysis.

The Honors Program at New York University, which was briefly mentioned in last year's report, has completed its first year of operation. This program was designed for selected students who desire to prepare themselves for careers in medical research and teaching. It permits a high degree of flexibility of the medical curriculum, a broad introduction to modern research in biology and medicine, and an opportunity for independent study and research training in areas of the student's own interests. The program is varied in its details to suit the needs and aims of the individual student. It should be a valuable background for investigation or research in either basic medical science or clinical areas. A seminar program open to all interested medical students in good standing and desirous of undertaking the extra work involved is conducted during the first two years of medical school. A weekly course of lectures and seminars dealing with various aspects of medical research is offered presenting subjects, broad in scope, frequently dealing with investigations in areas not covered in the usual medical school curriculum. Participating students have faculty advisors during their first year and subsequently meet with them informally and periodically to discuss the student's reading, research interests, summer plans, and electives. Bi-monthly participation in a Journal Club is also part of the program.

During spare time and summer vacation in the first two years, students have opportunities to become actively associated with a laboratory problem under the stimulus and guidance of a faculty member. Financial support is available for the students who wish to participate in research during the summer period. By the end of the second year, some students will have chosen a field of research interest and enter the Honors Program itself while others may defer their decisions to the end of the third year. According to the plan, candidate selection will be based on intellectual ability, motivation, and general suitability, with relatively few students becoming candidates for a degree with honors. The central focus of the Honors Program is a year of intensive research training. During this period the student will spend essentially full time in active laboratory investigation in an area of his choice, supported by a predoctoral research fellowship adequate to defray tuition and living expenses. After completion of this Medical Sciences Year the student will return to the regular third-or-fourth-year course and will have additional elective time available for his research. Completion of this Medical Sciences Year together with submission of a thesis indicating evidence of original and independent work will make students eligible for the M.D. degree with honors in their chosen branch of medical science.

During the first trimester, 12 students in the first-year class and 10 in the second-year group participated in this program. During the year other students applied, so that at the time the Honors Program Committee submitted its annual report, 20 first-year and 12 second-year students were enrolled. The list of 33 scientists who spearheaded the Saturday morning lectures and seminars and the topics covered by them would indicate that the students in this program enjoyed a rare and stimulating opportunity. The follow-through of this Honors

Program experiment will be observed with interest during the course of the next several years, particularly in relation to its potentialities in augmenting the ranks of basic medical science personnel.

The University of Virginia received a grant of $75,000 from the Public Health Service to implement a program in which selected medical students may, at the end of the second year, elect to spend three more years in medical school, during which period half their time will be spent in one of the basic science departments and the other half in completing the regular clinical assignments of the medical curriculum. The 18 months thus allocated to the basic science departments will be in blocks of at least 6 months and will be devoted to learning the methods of research, selected courses, active conduct of research, and preparation of a thesis. The objective here is to offer such students an unusual opportunity to prepare themselves for academic careers in medicine and at the same time contribute to the enrichment of the departments in which they work.

Several other medical schools have received grants from the Public Health Service to utilize research training in basic medical and allied fields, in what is essentially an experimental training program directed toward investigating the ways and means whereby medical students could receive such training early in their professional life. Currently such efforts are being pursued, in addition to New York University and the University of Virginia, at the University of Pennsylvania, University of Rochester, Emory University, Washington University at St. Louis, Johns Hopkins University, and the University of Washington.

At the University of Wisconsin, curriculum planning for the clinical years has effectively moved forward. Teaching time for psychiatry and pediatrics has been augmented. Arrangements have been consummated between the university and other hospitals in Madison whereby they are integrated into the educational programs in pediatrics and obstetrics-gynecology. This has made it possible to terminate the former arrangements in which undergraduate students received part of the obstetric and gynecologic experience at the Chicago Maternity Center and now focuses all undergraduate and graduate training in this area, in Madison. The University of Wisconsin has also been conducting an evaluation of their preceptor program through the assistance of a grant from the Rockefeller Foundation. The results of this study of what is the oldest of the currently operating preceptor programs in American medical schools will be of general interest to medical educators. The annual report from the University of Wisconsin indicates that alumni and medical students who had completed the preceptorship believed it to be an essential part of their education.

The University of Southern California reports that their curriculum committee has planned, and the faculty activated, a new "continuity" outpatient clinic in the fourth year. Each student will see and follow patients in a general medical clinic one half-day per week throughout the entire year. At Stanford, a Division of Physical Therapy has been incorporated into the School of Medicine. In the first year at Yale, provision has been made for an integrated program in basic neurology, replacing the instruction in neuroanatomy and neurophysiology formerly given separately. The field of neurology offers an unusually good opportunity for this type of integration which has apparently been successfully utilized by several medical schools during recent years.

Beginning with 1956-1957, Miami inaugurated a curriculum adjustment which encourages cooperation and integration between the basic medical science and clinical departments. Clinical correlation conferences are now utilized weekly to emphasize the clinical application of basic concepts in anatomy, biochemistry, and physiology. Such correlation conferences have been established in many medical schools during recent years. Reports indicate that they have met with varying degrees of success which undoubtedly is largely dependent upon the imagination, teaching ability, interest, and skill of the leadership they enjoy.

The University of Chicago has realigned its fourth-year program, essentially as follows. During the first quarter students serve half-time on obstetrics and gynecology clerkship and have the remaining half-time for their senior electives. During the second quarter, which is the "free" quarter, they may take electives, participate in research, serve as teaching assistants, or work in a hospital or medical school laboratory. The third and fourth quarters are devoted to a combined medicine, psychiatry, surgery experience involving full-time externship in the outpatient department. Correlative pathology is given throughout the senior year.

At Indiana University, active faculty curriculum planning and program activation has been under way for the past three and one-half years. The problems of immediate concern involve the move of the first year of medicine from the Bloomington campus to the medical campus in Indianapolis, which is currently scheduled for June, 1958.

Albert Einstein College of Medicine has planned and activated a Ph.D. program in medical sciences. A new graduate school for advanced study and research in the medical sciences at Albert Einstein College of Medicine was recently announced by the President of Yeshiva University. It will be known as the Sue Golding Graduate Division of Medical Sciences and is dedicated to assist in alleviating the serious shortage of trained investigators in the basic medical sciences. This new College of Medicine, which has just completed its first two years of teach-

ing, has appointed a new curriculum committee to make an extensive evaluation of their first two years of experience with the current program.

At Pittsburgh, a new curriculum committee has restudied the over-all aims of the School of Medicine. One of the major readjustments emanating from the study has brought about the transfer of physiology from the second to the first year, and revision of time allotments in all four years to permit students to do elective work. They have also coordinated the medical school schedules with those of the university and in so doing have changed from three 12-week trimesters to two 18-week semesters.

At Meharry Medical College, subcommittees for each of the four years of instruction studied syllabuses prepared by the various departments and held conferences with all those conducting instruction. Special attention was centered on (1) subject matter covered, (2) evidences of overlapping, (3) sequence of subject matter, and (4) correlation and integration. It was found that committee recommendations could be divided into three general groups, namely (1) those which could be immediately implemented, (2) those to be included in curriculum revision, and (3) worthwhile suggestions necessitating further evaluation and study prior to possible untilization.

In an integrated university–undergraduate medical school program at the University of Vermont, the program allows a few selected students from the fourth undergraduate collegiate year to take anatomic sciences. These students can then take physiology and biochemistry in what would ordinarily be their first year of medicine while they continue their collegiate undergraduate studies. Reports indicate that students who have chosen to follow this pattern are doing excellent work in both medical college and arts college subject matter.

This type of thoughtful, objective analysis of current programs directed towards improving opportunities in medical education is being conducted in many medical schools today in their efforts to adjust to the changing dimensions of medical science. For example, during the past five years the faculty of the University of Washington, which admitted its first class of students in 1946, has maintained an active and extremely useful Committee on the Objectives of Medical Education. This committee has been responsible for a continual faculty-wide objective reappraisal of great benefit to all concerned. During the past year over one hundred members of the medical school faculty attended lectures conducted by guest educators and participated in small group discussions and conferences on the objectives, as well as the pros and cons, of the elective system.

The administrative and other faculty personnel of newly developing medical schools such as Albert Einstein College of Medicine, University of Florida College of Medicine, University of Kentucky School of Medicine, and Seton Hall College of Medicine and Dentistry are all planning their developmental programs with due recognition of the needs created by these changing dimensions of medical science. There is increasing emphasis on the value of overcoming interdisciplinary barriers, increasing interdepartmental cooperation, and (although a certain degree of repetition is recognized as advantageous) eliminating wastage through needless duplication of effort. These challenges will not diminish; in fact, the future will probably present even greater and far more confounding issues to those working in the field of medical education and practice. The important thing is that all who are seriously concerned with medical education and practice today recognize that status quo characterizes nothing in this entire field except for the moment it exists. Progress involves change, but change in itself does not spell progress unless it is founded firmly on values which themselves are changeless and which include intangibles at times difficult to measure in terms of science. Readjustment and change are inescapable and genuinely difficult challenges present themselves in efforts to determine those factors which should be retained in whole or modified form, those which should be added or integrated, and those best discarded.

MATTERS OF GENERAL INTEREST TO MEDICAL EDUCATION

FIFTY-THIRD ANNUAL CONGRESS ON MEDICAL EDUCATION AND LICENSURE

The fifty-third Annual Congress on Medical Education and Licensure held at the Palmer House in Chicago, Feb. 9-12, 1957, was co-sponsored by the Council on Medical Education and Hospitals of the American Medical Association, the Federation of State Medical Boards of the United States, and the Advisory Board for Medical Specialties. Over one thousand individuals were in attendance during the course of the four-day congress.

The Federation of State Medical Boards of the United States conducted its first examination institute on Feb. 9, considering examinations in obstetrics.

The session co-sponsored by the Council on Medical Education and Hospitals with the Advisory Board for Medical Specialties was devoted to a conference on Graduate Education for General Practice–1957. The role of undergraduate medical education in preparation for graduate education was presented as background. This was followed by a statement on graduate training for the general practice of medicine today. Subsequently, there were statements on graduate education for general practice from the viewpoint of internal medicine, surgery, pediatrics, obstetrics and gynecology, and psychiatry. The series of papers presented during this conference was published in the April 27, 1957, issue of THE JOURNAL.

Medical Education Tomorrow served as the focus of the second half-day conference presented by the Council on Medical Education and Hospitals. Consideration was given to the lasting values in medical education, orienting medical students toward the "whole patient," science and medical education, the pros and cons of integration and correlation, the underlying cause of unrest in university medicine, and research knowledge and attitudes reflected in medical education. This series of papers appeared in the June 1, 1957, issue of THE JOURNAL.

The third half-day session presented by the Council consisted of a conference on postgraduate medical education. The current activities in postgraduate medical education of the Council on Medical Education and Hospitals were reported and the challenges presented by and importance of this field of education were discussed. Subsequently, a series of reports on successful postgraduate efforts utilizing different types of facilities, techniques, and methodologies was presented. This series of papers appeared in the May 25, 1957, issue of THE JOURNAL.

The Council on Medical Education and Hospitals, with its program co-sponsors, will continue efforts to make the Annual Congress on Medical Education and Licensure a forum for the presentation and discussion of problems of major concern in the area of medical education and licensure.

TEACHING INSTITUTE OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

An Institute on the Appraisal of Applicants to Medical Schools was held at Colorado Springs early in November, 1956, by the Association of American Medical Colleges immediately preceding their 67th annual meeting. This institute enjoyed leadership of the same order of excellence that has characterized the previous institutes devoted to specific areas of medical education. Since, as Mitchell [10] indicated, the whole future of medicine is dependent upon the caliber of men and women brought into it today, there can be little argument as to the value of the time, energy, and money involved in admissions procedures and that it represents a significant medical school responsibility. There was common agreement that admissions committees should be seeking for the best possible students (intellectual ability; integrity; strong motivation for the right reasons; personal qualities of warmth, depth, breadth, energy and drive) through procedures best adapted to the individual schools. Whatever the procedures utilized in this selection process, they should be the least traumatic to the students as possible, the most effective for the school within the bounds of fair play, and satisfactory to the colleges from which the students come.

The values of various factors utilized in the consideration of candidates, such as previous academic record, Medical College Admissions Test, various psychological testing procedures, personal interviews and recommendations, all received extensive consideration. In the utilization of the Medical College Admissions Test, the conclusions reached indicated that this test alone is disappointing as predictive of medical school standing, while, as a supplement to other information, it functions as a useful tool. The pitfalls and deficiencies as well as the potential advantages of the personal interview received a great deal of attention. Whether the merits of personal interviews outweigh their disadvantages apparently depends largely upon the objectives sought and the manner in which they are conducted. Unquestionably, the discussions at this institute have led to careful, objective re-evaluation of the methods and techniques of admissions procedures on the part of many admissions' committees during the past year.

This year's institute again was student-centered through focusing attention on the Ecology of the Medical Student. The institute was held at Atlantic City, Oct. 16-19, 1957, and the major topics considered were (*a*) Intramural Forces Affecting the Medical Student; (*b*) Diversity of Values and Objectives in Medical Education; (*c*) Noncurricular Factors Affecting the Medical Student; (*d*) Development of Professional Attitudes and Capacities; and (*e*) Educational Patterns for Medicine. More faculty members from the clinical areas participated than ever before. Sociologists who have initiated studies on the medical school as an institution of our society indicated certain of the methods of study which they have developed and some of the potential implications and values of their early studies. As has been characteristic of preceding institutes, this one stimulated interesting and critical self-appraisal and interchange of viewpoints. It is anticipated that the proceedings of this meeting will be published in the *Journal of Medical Education* at a future date.

FUNCTIONS AND STRUCTURE OF A MODERN MEDICAL SCHOOL

In 1910, the House of Delegates of the American Medical Association approved and authorized for publication a statement prepared by the Council on Medical Education (and Hospitals) on the "Essentials of an Acceptable Medical School." This statement was revised in 1913, 1927, 1933, 1934, 1936, 1938, 1945, and 1951. In 1956, when it appeared that revision was again necessary, the Council on Medical Education and Hospitals invited the Association of American Medical Colleges to collaborate in the preparation of a statement representing the general concepts of both groups. The statement, entitled "Functions and Structure of a Modern Medical School",[11] which replaces the former "Essentials of an Acceptable Medical School", was approved by the House of Delegates of the American Medical Association in June, 1957. At its recent annual meeting, the Association of American

Medical Colleges also approved this statement so that it now serves as a joint document of principles. It is in the process of printing for distribution to all institutions concerned to be used in place of the "Essentials of an Acceptable Medical School." It is intended that this statement will be used as a guide with the hope that it may assist in attaining medical education of ever higher standards, which are best nurtured in an environment not excessively concerned with standardization. The concepts which are expressed in the Functions and Structure of a Modern Medical School will serve as general rather than specific criteria in medical school accreditation.

A GUIDE REGARDING OBJECTIVES AND BASIC PRINCIPLES OF POSTGRADUATE MEDICAL EDUCATION PROGRAMS

Because of increasing interest and concern in the area of postgraduate and continuing education, the Council on Medical Education and Hospitals early in 1956 obtained from the Board of Trustees of the American Medical Association authorization to appoint an *Ad Hoc* Advisory Committee on Postgraduate Medical Education. This committee initiated its studies in April, 1956. It was requested to examine postgraduate medical education in its broadest aspects and to recommend to the Council a course of action that the American Medical Association might take that would be of assistance in improving the educational stature of this increasingly important field. It became apparent during the committee's early deliberations that a basic guide was needed which would be applicable to courses, as well as to other approaches in postgraduate medical education. Consequently, as its first major task the *Ad Hoc* Advisory Committee prepared "A Guide Regarding Objectives and Basic Principles of Postgraduate Medical Educational Programs" [12] as a contribution to an initial clarification of goals and guiding principles in this continuing phase of medical education. This guide, on recommendation of the Council, was approved by the House of Delegates in June, 1957. The guide has subsequently been published and widely distributed. In addition to objectives, the guide considers administration, budget, teaching staff, curriculum, facilities, educational methods, means of evaluating program effectiveness, and rewards as appropriate for postgraduate study.

The *Ad Hoc* Committee on Postgraduate Medical Education will continue its studies and will give particular attention to ways and means of possible evaluation of educational efforts in this field.

ADMISSION REQUIREMENTS OF AMERICAN MEDICAL SCHOOLS, 1957-1958

The Committee on Educational Research and Service of the Association of American Medical Colleges has prepared and published the eighth revision of "Admission Requirements of American Medical Colleges—1957-1958".[13] This volume contains a great deal of detailed information on each medical school as well as general information on the medical school admission process. The manner in which the data have been kept current through annual revisions makes this publication a valuable compendium of facts on premedical preparation in general and the admission policies of each medical school in particular. In the 1957-1958 revision the Canadian medical schools are included for the first time.

STRAIGHT INTERNSHIPS VS. ROTATING INTERNSHIPS

In 1952, the Advisory Committee on Internships following a prolonged and careful study submitted a report to the Council on Medical Education and Hospitals in which they favored the rotating internship over the straight internship as the generally most desirable initial training experience beyond medical school. Again in 1954, an *Ad Hoc* Committee on Internships, after an exhaustive study of the various controversial aspects of the internship, arrived at similar conclusions. In the 1955 revision of the "Essentials of an Approved Internship" the Council on Medical Education and Hospitals stated: "It is the opinion of the Council that the best basic education is provided by a well-organized and conducted rotating internship." The Council, however, continued to approve straight internships in medicine, surgery, pediatrics, and pathology, believing that such experiences may be justified in these fields for medical school graduates who have definitely determined to follow a specialized or academic career.

There continued to be a great deal of concern over the internship situation. In June, 1956, the House of Delegates of the American Medical Association adopted a report from its Reference Committee on Medical Education and Hospitals which requested the Council on Medical Education and Hospitals to (1) increase its efforts to encourage rotating internships rather than straight internships in all hospitals approved for the latter and (2) to submit a report of the results of this effort annually. Pending clarification of this situation, the Council approved no new applications for straight internships after June, 1956. In order that the Council might have adequate data and opinions on which to base a subsequent report to the House of Delegates, communications were sent to the administrator of each hospital offering approved straight internships, requesting a statement regarding the attitude toward such programs and indicating whether or not they should be discontinued in favor of rotating internships. The communication requested that the administrator take the matter up with the chief of each service conducting approved straight internships and also with the chairman of

the Intern Committee, in order that their views might be fully considered in the expression of opinion for the hospital.

As might be anticipated, in consideration of an issue of this nature, the replies were varied from calm, objective, and constructive analyses to emotional and even vitriolic comments of little or no assistance. The majority of the replies were exceedingly valuable in making it possible to analyze the pros and cons of arguments regarding straight and rotating internships in the setting afforded by this group of hospitals. A summarization of these opinions was carefully considered by the Council on Medical Education and Hospitals and presented to the House of Delegates of the American Medical Association in June, 1957. The Reference Committee on Medical Education and Hospitals in reporting to the House of Delegates indicated that it agreed with the Council on Medical Education and Hospitals that "straight internships of superior educational content are justified in the fields of medicine, surgery, pediatrics, and pathology because of their comprehensive scope." The committee, however, emphasized that this was not a refutation of previous actions of the House of Delegates and that it was still convinced that a sound well-organized rotating internship meets the present needs of medical education in a superior manner to the straight internship. The Council was requested to continue the encouragement of good rotating internships and to recognize straight internships only in situations of superior content and for the purpose of studying new methods of medical education. The reference committee also recommended that the Council on Medical Education and Hospitals be authorized to consider applications for straight internships in obstetrics and gynecology on the basis of educational merit in a manner similar to straight internships in medicine, surgery, pathology, and pediatrics. These recommendations were adopted by the House of Delegates.

Because of the changing values in the undergraduate clinical clerkship, the over-all length of medical education, the difficulties in organization and supervision of thoroughly excellent internships, whether rotating or straight, and many other factors, it seems probable that this facet of medical education will continue to be the focal point of considerable attention in the years ahead. Experimentation of the type suggested in the Johns Hopkins Revised Program will place a well organized and well supervised rotating internship experience within the fabric of the undergraduate curriculum itself. This approach differs from earlier situations requiring the internship before granting the medical degree by placing this rotating clinical experience within the curriculum and by conducting the program in the hospital which is an integral part of the medical school.

FOCUS ON THE FUTURE

MEDICAL SCHOOL INQUIRY, COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE, HOUSE OF REPRESENTATIVES—EIGHTY-FIFTH CONGRESS

On July 10, 1956, the Committee on Interstate and Foreign Commerce directed its professional staff "to gather all possible information bearing on the subject of Federal aid to medical schools and report to the committee early in the next Congress." This action was taken during the consideration of a bill (S849) which was designed to provide assistance to nonfederal institutions for the construction of health research facilities. It was the committee's decision that this bill (S849) should not be broadened to include matching grants for the construction of teaching facilities at medical schools and that separate legislation to this effect would be considered by the committee during the 85th Congress. S849 was enacted into law as Public Law 835, 84th Congress, and it contained no provision for federal assistance for construction of medical school teaching facilities.

The Staff Report to the Committee on Interstate and Foreign Commerce, House of Representatives, 85th Congress [14] was released during the Spring (1957). The report, covering 479 pages, includes, in addition to background introductory data, sections on medical schools, dental, and dental hygiene schools, osteopathic colleges, schools of public health, and an extensive appendix of sources and supplementary material. The authors of this report have brought together an enormous amount of factual data relevant to their assignment and have presented it in the question-answer format which in the medical school section alone involves 167 queries. These questions and answers are cross indexed with the appendical data. The medical school section is divided into three subsections dealing with (1) present and future capacity of medical schools, (2) graduates of medical schools and physician requirements, and (3) financial aspects of medical schools and medical students. This report is a valuable reference, not only for the Committee on Interstate and Foreign Commerce but also for handy reference to a large amount of authentic factual information on schools of medicine, dentistry, osteopathy, and public health which has been collected from a number of sources.

HEALTH MANPOWER CHART BOOK

The "Health Manpower Chart Book" [15] prepared by the Division of Public Health Methods of the Public Health Service, Department of Health, Education, and Welfare as Public Health Service Publication 511, was originally prepared for limited distribution at the Oct. 24, 1956, meeting of the National Advisory Health Council. Following some revision it was printed for general distribution to the schools of the health professions and to persons interested in the provision of health services to the

people of the United States. It presents in statistical and graphic terms (1) a summary of health manpower in the United States, and separate sections dealing with (2) physicians, (3) dentists, and (4) professional nurses.

This chart book points out that college enrollment in the United States has increased from 598,000 in 1920 to 2,755,000 in 1955 with projected estimates of 3,778,000 (1960), 4,860,000 (1965), and 6,443,000 (1970). During the period from 1920 to 1955 the percentage of college age population enrolled in college increased from 4.6 to 18.2, while the percentage of total college enrollment in medical schools dropped from 2.4 to 1.0% during the same period. In other words, these studies demonstrated that total population (estimated by the U. S. Census Bureau to be in excess of 220 million in 1975) and total college enrollments are projected to increase relatively far more rapidly than any current projections of medical school enrollment or physician production from medical schools in this country (tables 1 and 2). Thus, in the future, unless there is an expansion of medical educational facilities and a larger enrollment of students in schools of medicine, there will begin to be a decrease in the physician-population ratio of increasing magnitude as time goes on.

TABLE 1.—*United States Population 1900-1955, and Estimated 1955-1975**

	Population (In Thousands)	Increase (per Decade)	% Increase (per Decade)
Census of 1900	75,995	.....	....
Census of 1910	91,972	15,978	21.0
Census of 1920	105,711	13,738	14.9
Census of 1930	122,775	17,064	16.1
Census of 1940	131,669	8,894	7.2
Census of 1950	150,697	19,028	14.5
Estimate for 1955	165,248	.....	....
Forecast for 1960	177,840	27,143	18.0
Forecast for 1965	190,296	.....	....
Forecast for 1970	204,620	26,780	15.1
Forecast for 1975	221,522	.....	....

* United States Bureau of the Census. Current Population Reports, Series P-25, No. 123, "Revised Projections of the Population of the United States by Age and Sex: 1960-1975," Oct. 20, 1955. Projection A.

STATEMENT ON THE FUTURE NEED FOR PHYSICIAN ASSOCIATION OF AMERICAN MEDICAL COLLEGES

Several months ago the Association of American Medical Colleges issued a carefully prepared statement on the Future Need for Physicians which is quoted in full:

The changing nature of our industrial civilization, the increasing population, and the expanding knowledge revealed by research have and will continue to have a profound effect upon our educational programs. It is a responsibility of the universities and of the professions to recognize and meet the needs of society. There is no area in which this obligation is greater than in the field of the health sciences.

Within the next decade, the health care of the American people based on greater knowledge through research will require increasing numbers of all types of personnel including physicians. Further, many more young men and women will be seeking higher education and training in one of the health professions.

In the ten-year period (1945-46 to 1955-56) since the end of World War II the number of medical schools has increased from 77 to 82, the number of freshmen from 6,060 to 7,686 and the number of graduates from 5,655 to 6,845. Two new medical schools admitted a freshman class for the first time in the fall of 1956. At least one other school is in the process of formation and will admit its first class in 1959.

Although the Association of American Medical Colleges is proud of this record of the medical schools in responding to the needs of the postwar world, it also believes that more remains to be done. Medical education should be expanded further without impairment in the high quality which has been carefully built up in the United States since 1910. It is possible that some existing schools can, with new facilities and larger faculties, accept additional students, but the need will not be met completely in this manner. The larger contribution in numbers of students will come, as it has in the past, by the establishment of new schools.

TABLE 2.—*Trend in College-Age Population and in College Enrollment, United States**

		Total College Enrollment		Medical School Enrollment	
Year	Population 18 to 24 years old	No.	% of College-age Population	No.	% of Total College Enrollment
1920	12,989,000	598,000	4.6	14,242	2.4
1930	15,482,000	1,101,000	7.1	21,964	2.0
1940	16,607,000	1,494,000	9.0	23,255	1.6
1950	16,014,000	2,659,000	16.6	27,005	1.0
1955	15,106,000	2,755,000	18.2	28,564	1.0
1960	16,237,000	3,778,000	23.3	30,000	.8
1965	20,043,000	4,860,000	24.2	30,500	.6
1970	24,694,000	6,443,000	26.1	(?)	(?)
1973	26,360,000	.....	....	.....	...

* Source: United States Bureau of Census figures on college-age population: current Population Reports, Series P-25, No. 98, 114, 132, and 146.
United States Office of Education. Biennial Survey of Education in the United States, 1952-1954. Chap. 4, sect. 1, p. 7. With projections (dated June 1, 1956). Medical school enrollment figures prior to 1955 are those used in deriving total college enrollments. The 1955 figure is from the Education Number of THE JOURNAL, Aug. 25, 1956, page 1652; 1960 and 1965 projections are based on information on page 1643 of that issue.

On the other hand, many schools have already expanded their enrollment without increase or improvement of physical plant. The 84th Congress authorized construction of research facilities, but as was pointed out by the President, this met only a part of the need to maintain the present quality of teaching for the present number of students.

The Association of American Medical Colleges urges its member institutions to survey their potentialities and capacities in light of the future need for health personnel, and urges universities in large urban centers, now without a medical school to give serious consideration to the establishment of one.

The latent period between the determination to form a medical school and service of the graduates to the people is 8 to 14 years; 2 to 4 years to plan the program, construct the buildings, and secure a faculty; 4 years for medical education and 2 to 6 years for hospital training as an intern and resident. Hence, if we are to meet the problem, it should be borne in mind that plans made in 1956 are not for next year or the year after, but for the needs of the nation in 1964 to 1970.

A program of expansion will require large sums of money, both for capital expenditures and for operating expense. The Association of American Medical Colleges is dedicated to

the preservation of joint and coordinated support of medical education from private and government sources and believes the American people are willing and able to back ventures which will mean better health and a happier life.

Looking into the future, Dr. Vernon W. Lippard [16] pointed up some of the needs in facilities and financing of medical education, in an address before a special meeting sponsored by the National Fund for Medical Education held in Chicago, March 5, 1957. Dr. Lippard pointed out that with an estimated population of 220 million in 1975, there would need to be 2,000 more physicians than are currently graduated annually from medical schools in the United States to maintain the existing physician-population ratio. This, he indicated, would necessitate the addition of about 25 new medical schools of the current median size and the financing essential to their development and maintenance.

NEED FOR OBJECTIVE ANALYSIS

During the past few years there has been evidence of interest on the part of individuals and groups within the medical profession as well as in lay and government circles over the desirability of projecting more adequately into the needs of the future. In the 55th Annual Report on Medical Education in the United States and Canada [17] the Council indicated that

> From various quarters there is constant representation of increased needs for medical personnel. Needs for additional facilities for the education of physicians are exceedingly difficult to determine and require careful analysis of who represents what need. No one will deny the fact that, with a constantly growing population and with the ever-increasing health consciousness of the nation, there will be a constant and continuous demand for increased numbers of medical personnel and that this will necessitate new schools and possible augmentation of facilities and faculty personnel of those now in existence. . . .

There are certain very clear-cut and unescapable facts underlying the increasing concern on the part of many individuals and groups as to the need for careful study and constructive planning for the medical education of the future. Population estimates for the years ahead indicate numbers considerably in excess of those of the most reliable population experts of a few decades ago. The steadily increasing percentage of college age individuals who are entering institutions of higher education and the deluge that lies ahead in the sixties present challenges to every facet of higher education in the nation. The development of many new areas of scientific and economic activity now offer challenging opportunities for the highest caliber youthful intellects that have presented medicine and other professional fields with competition unknown until recent years.

In the field of medicine itself the utilization of physician-population ratios as an index of physician needs is replete with fallacies. This is particularly true when efforts are made to utilize unqualified "across the board" statistics for physician-population ratios in recent years compared to those early in the century. Memories of the utterly chaotic situation existing in medical education and practice early in the century have faded from public and even professional consciousness during recent years as the shoddy diploma mills and questionable medical schools disappeared. "How many doctors are enough?" becomes an increasingly complex question to answer in the rapidly changing scene. Modern transportation and means of communication, new diagnostic techniques, and greatly enhanced therapeutic approaches have created a world so different today for the physician and what he is capable of accomplishing that straight unqualified statistical comparison with earlier years steadily becomes less meaningful.

Furthermore, in the current setting, such activities as administration (medical school, hospital, public health, occupational medicine, Veterans Administration, Military Medical Forces), full-time teaching and research, etc., unquestionably remove many physicians from active medical practice today. The development of certain specialty areas in recent years, such as anesthesiology, radiology, and pathology, although entirely laudable and desirable, tends to remove an increasing number of physicians from practice or routine care of patients in the ordinary sense. The nature of medical practice itself, the increased hospital utilization, the development of clinics and other practice arrangements, all contribute to the complexity of this changing scene. As the population grows older and a relatively greater proportion of people reach the upper age brackets, certain increased needs for medical care arise. One only need review the events of the past quarter of a century in such areas as syphilology, urology, and otolaryngology to appreciate how the development of new therapeutic weapons can, in a short period of time, bring about such vast changes that the very nature of an entire specialty field can be significantly altered. The readjustments brought about through the prepayment of hospital and medical care have radically changed some phases of medical practice in a relatively short span of years.

After the revolution in medical education took place in 1910, medical schools gradually developed as there seemed to be a need for them. As the population of states augmented and more physicians appeared to be desirable, state legislatures have authorized their universities to develop medical schools. Private philanthropy played a role of tremendous importance in making it possible for privately owned and supported universities to develop medical schools. The question now confronting the nation is whether or not through continuation of the same manner of growth, adequate new medical educational facilities can be developed to meet needs that in themselves are not clearly defined.

It would appear to be desirable to undertake a broad-gauge objective analysis of this entire field directed toward more clearly defining trends and possible personnel needs. Such an analysis might well include an evaluation of potential sites for development of new medical schools as well as stimulation of increased interest on the part of institutions of higher education to engage in such ventures.

The 54th Congress on Medical Education and Licensure to be held Feb. 9-11, 1958, at the Palmer House in Chicago, will focus attention on the factors of importance which impinge on medical education and practice in this changing scene. Efforts will be made to determine some of the questions which need to be further examined and clarified and to discuss possible approaches to their solutions during the years ahead.

BACKGROUND PREPARATION FOR GENERAL PRACTICE

At the meeting of the House of Delegates of the American Medical Association in Seattle, Nov. 27-30, 1956, the Committee on Medical Practice presented a report in which was included a recommendation for the establishment of a study group to consider the best background preparation for general practice. At its meeting on Dec. 14, 1956, the Executive Committee of the Board of Trustees voted that the Council on Medical Education and Hospitals address itself to this matter and that it form a study group with representatives of the Council, the Association of American Medical Colleges, and the American Academy of General Practice, and representatives of the specialty areas and proceed "to objectively analyze and make recommendations as to the best background preparation today for general practice."

Subsequently, a committee known as the Committee on Preparation for General Practice was established with representatives from the Council, the Association of American Medical Colleges, and the American Academy of General Practice. It was believed that the initial deliberations should be conducted with this type of representation and that representatives from various specialty fields should be brought in as the studies progressed. At the initial meeting in January, 1957, the committee agreed to consider the following four questions: 1. What is general practice? 2. Is what is defined as general practice of lasting value to the health care of the United States public? 3. What preparation is needed for this type of practice? 4. How can the preparation best be offered? Three subcommittees were appointed to study specific assignments dealing with these questions. These subcommittees have held several meetings, and, at the time of publication of this annual report, the parent committee has met on several occasions.

Tied in with the consideration of this matter are the background activities and the reports of the Committee on General Practice Prior to Specialization. In the study of its assignment, this committee considered the following specific questions: (1) Is general practice prior to specialization desirable? (2) Is it practical? (3) If so, how can it be implemented? During the course of these studies, the committee met with representatives of all of the specialty boards, the Council on Medical Education and Hospitals, and the American Academy of General Practice. At the June 6, 1957, meeting, the committee submitted majority and minority reports to the Board of Trustees and House of Delegates, the majority report being recommended by the Reference Committee on Medical Education and Hospitals for adoption with such action subsequently being taken. In essence, this report referred to the fact that "the studies, conclusions, and recommendations of this new committee (Committee on Preparation for General Practice) appear to be basic to any further consideration of the possible role of general practice prior to specialization." It was recommended "that this new committee in its long term cooperative study with appropriate groups, give full consideration to the importance of a broad background of training and experience for all physicians in the care of the patient as a whole and of the family as a unit." The report, furthermore, recommended that the Committee on General Practice Prior to Specialization be discharged and any further pursuit of studies in this field be referred to the joint committee of the Council on Medical Education and Hospitals, Association of American Medical Colleges, and the American Academy of General Practice. This committee has an interesting and challenging opportunity in the further study of this over-all problem during the year ahead.

SECOND WORLD CONFERENCE ON MEDICAL EDUCATION

The Second World Conference on Medical Education is scheduled to be held in Chicago during the first week of September, 1959. "Medicine—A Life-Long Study" has been adopted as the theme for this conference, with special emphasis directed toward medical education beyond the medical school. The program will consider such areas as (*a*) basic clinical training for all doctors; (*b*) advance clinical training for general and specialty practice; (*c*) training for teaching and research; and (*d*) continuing medical education. Participants in the Second World Conference on Medical Education will include leaders in this field from nations throughout the world. The conference will offer an unusual opportunity for the first-hand exchange of information on the progress and problems encountered in the field of medical education and research as scholars in medicine from all parts of the world gather together.

APPROVED MEDICAL SCHOOLS

During the academic year 1956-1957, the schools of medicine of the University of Mississippi and the University of Missouri graduated their first classes. They were both granted full approval as four-year medical schools, increasing the number of such institutions in the United States to 78. Since both were previously approved schools of basic medical sciences, the number of schools in this category is now reduced to four.

The University of Saskatchewan College of Medicine in Canada also completed its expansion to a full four-year program and was granted approval. All 12 medical schools in Canada are now approved four-year institutions.

Table 3 lists by states the approved four-year medical schools and the schools of basic medical sciences, indicating whether publicly or privately owned, year of organization, and other pertinent data. Similar data is presented for newly developing medical schools. Similar information concerning Canadian schools is given in table 4.

The Albert Einstein College of Medicine in New York City has had in operation the first two years of its planned four-year program and this fall initiated the third year. On the basis of a Liaison Committee survey visit, it was granted provisional approval and will be eligible for full approval on implementation of the four-year program in 1958-1959.

NEWLY DEVELOPING MEDICAL SCHOOLS

New medical schools in the active process of development include Albert Einstein College of Medicine in New York City, Seton Hall College of Medicine and Dentistry in Jersey City, and the University of Florida College of Medicine in Gainesville, Fla. At Albert Einstein, the initial class has completed two years of study. At Seton Hall and the University of Florida, initial classes have completed their first year of study.

The contract for the construction of the teaching hospital for the Medical Center at West Virginia University has been executed recently and it is expected that the project will be completed in 1960. Students will be able to undertake their clinical studies in the expanded institution beginning in September, 1960. In last year's annual report, it was estimated that the expansion would have occurred in time to enroll third-year students in September, 1959.

The initial administrative staff has been assembled in Lexington for the medical school at the University of Kentucky. Present planning calls for admitting the first class in 1959 or 1960.

Interest in the development of a medical school as part of the University of Connecticut has been mentioned in earlier reports. The Council is not currently aware of any final decisions in regard to this possible development. Correspondence from various sources indicates an initial consideration of the potentiality of construction of medical school facilities in San Antonio, Texas, and Toledo, Ohio. There is also evident interest in the possibility of developing a school of basic medical sciences in Arizona and in New Mexico.

CONSTRUCTION OF FACILITIES, 1956-1957

Thirty-three schools reported either the initiation or completion of major construction projects during 1956-1957, while 49 institutions indicated neither initiation nor completion of major construction projects during this period. Major projects initiated include the construction of the auditorium, lecture rooms, and dormitory facilities and expansion of physical medicine and rehabilitation at New York University; the teaching and research hospital developed at Ohio State University; the basic science research laboratories at the University of Cincinnati; and the University of Pittsburgh teaching and research facilities. In all, 19 medical schools reported the initiation of construction projects estimated to cost approximately $32,200,000.

Twenty of the 33 schools reporting construction activities indicated the completion of projects during 1956-1957, representing an investment of $67,500,000. These include completion of the basic science teaching and research building at Howard University, the medical science building at the University of Florida, Emory University's building to house its geographical full-time faculty, completion of the University of Missouri Medical School–Hospital plant and related facilities, and the construction of the research wing at the University of Buffalo Medical School. Others include the development of residence facilities for students, interns, residents, and nurses at New York University, the construction of psychiatric facilities at the University of North Carolina, completion of the inpatient, outpatient ancillary facilities at Temple University, faculty housing and power plant at the University of Texas (Galveston), the completion of the basic science building at West Virginia University, and the anatomic teaching and research and biochemistry teaching and research laboratories and animal quarters at the University of Wisconsin. Significant new construction, modernization, or refurbishing has been accomplished in the other institutions reporting completion of construction during this period.

MEDICAL SCHOOL FINANCING

This year information on medical school financing was sought only as it pertained to the amount and source of anticipated operating income for the academic year 1957-1958. The inquiry was expanded to include anticipated income from clinical activities for support of medical school operations. Study of the responses makes it evident that changes in the form and content of the inquiries

TABLE 3.—*Approved Medical Schools and Schools of the Basic Sciences in the United States**

State	No.	Approved Four-Year Medical Schools	Ownership†	Year Organized	Tuition		1957-1958 Academic Year	Premedical Requirement by Yr.	Students by Classes, 1956-1957					Part-Time and Special Students	Graduates 7-1-56 to 6-30-57		
					Resident	Non-Resident			1st Yr.	2nd Yr.	3rd Yr.	4th Yr.	Total				
Ala.	1	Medical College of Alabama, Birmingham	Pub	1943	$ 445	$ 845	9-16-57	3	81	77	67	74	299	2	71	Robert C. Berson, M.D., Dean	1
Ark.	2	University of Arkansas School of Medicine, Little Rock	Pub	1879	380	...	9- 9-57	3	100	77	85	79	341	5	77	F. Douglas Lawrason, M.D., Dean	2
Calif.	3	College of Medical Evangelists, Loma Linda; Los Angeles	Pri	1909	1,250	1,250	9- 5-57	3	98	84	96	98	376	2	98	Walter E. Macpherson, M.D., Dean	3
	4	University of Southern California School of Med., Los Angeles	Pri	1885	1,020	1,020	9-23-57	3	68	68	62	68	266	0	68	Thomas H. Brem, M.D., Chairman, Admin. Committee	4
	5	Stanford University School of Medicine, San Francisco	Pri	1908	1,005	1,005	9-23-57	3	62	58	55	57	232	0	57	Robert H. Alway, M.D., Acting Dean	5
	6	University of California School of Medicine, Los Angeles	Pub	1951	350	600	9-10-57	3	50	50	48	32	180	1	36	Stafford Warren, M.D., Dean	6
	7	University of California School of Medicine, San Francisco	Pub	1864	334	584	9-16-57	3	78	76	84	74	312	0	74	John B. deC. Saunders, M.D., Dean	7
Colo.	8	University of Colorado School of Medicine, Denver	Pub	1883	655	2,655	9-23-57	3	84	86	79	73	322	0	70	Robert J. Glaser, M.D., Dean	8
Conn.	9	Yale University School of Medicine, New Haven	Pri	1812	1,025	1,025	9-18-57	3	80	80	82	80	322	6	80	Vernon Lippard, M.D., Dean	9
D.C.	10	Georgetown University School of Medicine, Washington	Pri	1851	960	960	9- 9-57	Degree	114	96	97	117	424	0	114	Francis M. Forster, M.D., Dean	10
	11	George Washington University School of Medicine, Washington	Pri	1825	950	950	9-16-57	3	102	92	90	88	372	0	88	John L. Parks, M.D., Dean	11
	12	Howard University College of Medicine, Washington	Pri	1869	580	580	9- -57	4	78	78	68	72	297	9	72	Robert S. Jason, M.D., Dean	12
Fla.	13	University of Miami School of Medicine, Coral Gables	Pri	1952	700	1,400	9- 5-57	3	71	69	62	34	236	1	34	Homer F. Marsh, Ph.D., Dean	13
Ga.	14	Emory University School of Medicine, Emory University	Pri	1854	1,000	1,000	9- -57	3	74	71	67	74	286	3	74	Arthur P. Richardson, M.D., Dean	14
	15	Medical College of Georgia, Augusta	Pub	1828	455	...	9- -57	3	102	98	96	80	376	5	78	Harry B. O'Rear, M.D., Dean	15
Ill.	16	Chicago Medical School	Pri	1912	672	672	9-30-57	4	74	68	68	67	277	0	66	John J. Sheinin, M.D., President	16
	17	Northwestern University Medical School, Chicago	Pri	1859	930	930	9-30-57	3	133	128	132	127	520	2	126	Richard H. Young, M.D., Dean	17
	18	Stritch School of Medicine of Loyola University, Chicago	Pri	1915	800	800	9-30-57	3	88	88	76	78	330	0	82	John F. Sheehan, M.D., Dean	18
	19	University of Chicago, The School of Medicine	Pri	1924	937.50	937.50	9-25-57	3	72	73	73	69	287	0	69	Lowell T. Coggeshall, M.D., Dean, Division of Biological Sciences	19
	20	University of Illinois College of Medicine, Chicago	Pub	1882	343.50	763.50	9-30-57	3	191	154	153	146	644	1	146	Granville A. Bennett, M.D., Dean	20
Ind.	21	Indiana University School of Medicine, Bloomington; Indianapolis	Pub	1903	400	700	9- -57	3	159	141	144	139	583	2	139	John D. Van Nuys, M.D., Dean	21
Iowa	22	State University of Iowa College of Medicine, Iowa City	Pub	1869	400	800	9-19-57	3	122	102	112	97	433	2	97	Norman B. Nelson, M.D., Dean	22
Kan.	23	University of Kansas School of Medicine, Lawrence; Kansas City	Pub	1880	475	925	9- 5-57	Degree	104	96	108	107	415	0	107	W. Clarke Wescoe, M.D., Dean	23
Ky.	24	University of Louisville School of Medicine, Louisville	Pri	1837	900	1,300	9- 9-57	3	104	89	92	94	379	3	90	J. Murray Kinsman, M.D., Dean	24
La.	25	Louisiana State University School of Medicine, New Orleans	Pub	1931	120	520	9- 3-57	3	125	108	98	97	428	3	96	William W. Frye, M.D., Dean	25
	26	Tulane University of Louisiana School of Medicine, New Orleans	Pri	1834	1,000	1,000	9-15-57	3	134	120	128	124	506	1	124	Maxwell E. Lapham, M.D., Dean	26
Md.	27	Johns Hopkins University School of Medicine, Baltimore	Pri	1883	980	980	9-13-57	Degree	78	73	75	67	293	0	67	Thomas B. Turner, M.D., Dean	27
	28	University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore	Pub	1807	735	885	9-17-57	3	93	93	83	94	363	1	94	William S. Stone, M.D., Dean	28
Mass.	29	Boston University School of Medicine	Pri	1873	1,000	1,000	9- 9-57	3	76	66	75	69	286	0	69	Chester S. Keefer, M.D., Director	29
	30	Harvard Medical School, Boston	Pri	1782	1,061.50	1,061.50	9-20-57	2	115	118	138	144	515	1	145	George Packer Berry, M.D., Dean	30
	31	Tufts University School of Medicine, Boston	Pri	1893	1,015	1,015	9-18-57	3	112	105	112	112	441	1	113	Joseph M. Hayman Jr., M.D., Dean	31
Mich.	32	University of Michigan Medical School, Ann Arbor	Pub	1850	440	770	9-16-57	3	202	193	181	186	762	4	186	A. C. Furstenberg, M.D., Dean	32
	33	Wayne State University College of Medicine, Detroit	Pub	1885	543	...	9-10-57	3	77	71	71	66	285	2	65	Gordon H. Scott, Ph.D., Dean	33
Minn.	34	University of Minnesota Medical School, Minneapolis	Pub	1883	438	824	9-30-57	3	130	119	114	111	474	2	109	Harold S. Diehl, M.D., Dean	34
Miss.	35	University of Mississippi School of Medicine, Jackson	Pub	1903	600	825	9- -57	3	76	69	45	24	214	0	24	David S. Pankratz, M.D., Dean	35
Mo.	36	University of Missouri School of Medicine, Columbia	Pub	1845	460.50	...	9- -57	3	75	39	33	23	170	0	21	Roscoe L. Pullen, M.D., Dean	36
	37	St. Louis University School of Medicine	Pri	1901	890	890	9-17-57	3	123	125	121	112	481	6	112	James W. Colbert Jr., M.D., Dean	37
	38	Washington University School of Medicine, St. Louis	Pri	1842	906	906	9-16-57	3	86	81	87	93	347	0	93	Oliver H. Lowry, M.D., Dean	38
Neb.	39	Creighton University School of Medicine, Omaha	Pri	1892	912	912	9-16-57	3	76	76	66	69	287	0	69	F. G. Gillick, M.D., Dean	39
	40	University of Nebraska College of Medicine, Omaha	Pub	1881	525	765	9-18-57	3	87	72	80	79	318	0	77	James P. Tollman, M.D., Dean	40
N.Y.	41	Albany Medical College	Pri	1838	1,000	1,000	9- 9-57	3	68	53	60	49	230	0	49	Harold C. Wiggers, Ph.D., Dean	41
	42	University of Buffalo School of Medicine	Pri	1847	1,000	1,000	9-21-57	4	84	74	76	66	300	4	65	Stockton Kimball, M.D., Dean	42
	43	Columbia University College of Physicians and Surgeons, New York City	Pri	1767	983	983	9-16-57	3	120	122	116	114	472	0	114	Willard C. Rappleye, M.D., Dean	43
	44	Cornell University Medical College, New York City	Pri	1898	1,100	1,100	9-12-57	3	84	83	82	86	335	0	86	John E. Deitrick, M.D., Dean	44
	45	New York Medical College, Flower and Fifth Avenue Hospitals, New York City	Pri	1858	1,036	1,036	9- 5-57	Degree	128	128	121	109	486	0	109	Ralph E. Snyder, M.D., Dean	45

	46	New York University College of Medicine, New York City	Pri	1841	1,117	1,117	9- 9-57	3	136	129	130	127	522	1	127	Donal Sheehan, M.D., Dean	46
	47	State University of New York College of Medicine, New York City	Pub	1858	715	715	9-16-57	3	155	141	146	145	587	2	145	Robert A. Moore, M.D., Dean	47
	48	State University of New York College of Medicine, Syracuse	Pub	1872	700	700	9- 6-57	3	79	74	72	63	288	2	63	Carlyle Jacobsen, Ph.D., President	48
	49	University of Rochester School of Medicine and Dentistry	Pri	1925	900	900	9- 9-57	3	71	69	74	65	279	1	65	Donald G. Anderson, M.D., Dean	49
N.C.	50	Duke University School of Medicine, Durham	Pri	1930	1,020	1,020	9-30-57	3	78	78	82	81	319	2	80	Wilburt C. Davison, M.D., Dean	50
	51	Bowman Gray School of Medicine of Wake Forest College, Winston-Salem	Pri	1922	825	825	10- 7-57	3	54	51	49	55	209	1	55	Coy C. Carpenter, M.D., Dean	51
	52	University of North Carolina School of Medicine, Chapel Hill	Pub	1890	671	1,271	9- -57	3	67	66	61	58	252	1	58	W. Reece Berryhill, M.D., Dean	52
Ohio	53	University of Cincinnati College of Medicine	Pub	1819	700	825	9-23-57	3	94	86	77	79	336	0	79	Stanley E. Dorst, M.D., Dean	53
	54	Western Reserve University School of Medicine, Cleveland	Pri	1843	1,000	1,000	9-18-57	3	91	80	80	73	324	4	73	Joseph T. Wearn, M.D., Dean	54
	55	Ohio State University College of Medicine, Columbus	Pub	1914	561	...	9- -57	3	150	144	138	135	567	0	133	Charles A. Doan, M.D., Dean	55
Okla.	56	University of Oklahoma School of Medicine, Oklahoma City	Pub	1900	450	800	9-16-57	3	101	97	86	89	373	0	88	Mark R. Everett, Ph.D., Dean	56
Ore.	57	University of Oregon Medical School, Portland	Pub	1887	546	804	9-30-57	3	76	73	78	66	293	0	65	D. W. E. Baird, M.D., Dean	57
Pa.	58	Hahnemann Medical College and Hospital of Philadelphia	Pri	1848	922	922	9- 9-57	Degree	108	97	96	97	398	0	97	Charles Cameron, M.D., Dean	58
	59	Jefferson Medical College of Philadelphia	Pri	1825	882.52	882.52	9-10-57	3	180	175	162	165	682	0	165	George Allen Bennett, M.D., Dean	59
	60	Temple University School of Medicine, Philadelphia	Pri	1901	850	850	9- 9-57	3	137	120	119	115	491	0	114	William N. Parkinson, M.D., Dean	60
	61	University of Pennsylvania School of Medicine, Philadelphia	Pri	1765	1,000	1,000	9- 3-57	3	126	122	128	127	503	0	126	John McK. Mitchell, M.D., Dean	61
	62	Woman's Medical College of Pennsylvania, Philadelphia	Pri	1850	975	975	9- 9-57	3	50	46	45	41	182	0	40	Marion Fay, Ph.D., Dean	62
	63	University of Pittsburgh School of Medicine	Pri	1886	1,048	1,048	9- 9-57	3	100	87	82	93	362	0	91	William S. McElroy, M.D., Dean	63
S.C.	64	Medical College of South Carolina, Charleston	Pub	1823	435	...	9-12-57	3	80	75	77	73	305	0	74	John T. Cuttino, M.D., Dean	64
Tenn.	65	University of Tennessee College of Medicine, Memphis	Pub	1876	450	675	Quarterly	3	225	194	182	186	787	11	185	O. W. Hyman, Ph.D., Dean	65
	66	Meharry Medical College, Nashville	Pri	1876	794	794	9-16-57	3	74	64	65	55	258	15	53	Daniel T. Rolfe, M.D., Dean	66
	67	Vanderbilt University School of Medicine, Nashville	Pri	1874	1,010	1,010	9-23-57	Degree	54	48	47	53	202	2	53	John B. Youmans, M.D., Dean	67
Texas	68	University of Texas Southwestern Medical School, Dallas	Pub	1943	110	...	9- 4-57	3	106	94	95	95	390	9	91	Atticus J. Gill, M.D., Dean	68
	69	University of Texas Medical Branch, Galveston	Pub	1890	106	...	9-16-57	3	164	148	159	130	601	0	129	John B. Truslow, M.D., Executive Director	69
	70	Baylor University College of Medicine, Houston	Pri	1900	897.50	897.50	9-10-57	3	82	82	81	91	336	12	90	Stanley W. Olson, M.D., Dean	70
Utah	71	University of Utah School of Medicine, Salt Lake City	Pub	1905	480	830	9- -57	3	54	54	47	57	212	0	57	Philip B. Price, M.D., Dean	71
Vt.	72	University of Vermont College of Medicine, Burlington	Pub	1822	555	1,005	9-16-57	3	50	48	41	40	179	0	40	George A. Wolf, M.D., Dean	72
Va.	73	University of Virginia School of Medicine, Charlottesville	Pub	1827	514	964	9-20-57	3	76	74	72	75	297	0	75	Thomas Harrison Hunter, M.D., Dean	73
	74	Medical College of Virginia, Richmond	Pub	1838	586	911	9- -57	3	84	83	101	96	364	0	95	William F. Maloney, M.D., Dean	74
Wash.	75	University of Washington School of Medicine, Seattle	Pub	1945	408	678	10- 2-57	3	76	69	73	72	290	0	72	George N. Aagaard, M.D., Dean	75
Wis.	76	University of Wisconsin Medical School, Madison	Pub	1907	340	660	9-23-57	3	83	81	76	78	318	15	77	John Z. Bowers, M.D., Dean	76
	77	Marquette University School of Medicine, Milwaukee	Pri	1912	900	900	9- 9-57	3	103	96	99	99	397	7	100	John S. Hirschboeck, M.D., Dean	77
Puerto Rico	78	University of Puerto Rico School of Medicine, San Juan	Pub	1949	558	558	8-18-57	3	52	46	45	41	184	0	41	E. Harold Hinman, M.D., Dean	78
		Totals							7,654	7,078	7,023	6,834	28,589	154	6,796		
		Approved Schools of Basic Medical Sciences															
N.H.	1	Dartmouth Medical School, Hanover	Pri	1797	1,117.50	1,117.50	9- -57	3	24	24	...	...	48	0	...	Rolf C. Syvertsen, M.D., Dean	1
N.D.	2	University of North Dakota School of Medicine, Grand Forks	Pub	1905	178	416	9- 4-57	3	41	39	...	...	80	2	...	Theodore H. Harwood, M.D., Dean	2
S.D.	3	University of South Dakota School of Medical Sciences, Vermillion	Pub	1907	320	550	9- 3-57	3	41	36	...	...	77	4	...	W. L. Hard, Ph.D., Dean	3
W.Va.	4	West Virginia University School of Medicine, Morgantown	Pub	1912	264	700	9-13-57	3	31	27	...	...	58	0	...	Edward J. Van Liere, Ph.D., Dean	4
		Totals							137	126	...	...	263	6	...		
		Schools Developing New Programs															
Fla.	1	University of Florida College of Medicine, Gainesville	Pub	1956	600	1,200	9- 57	4	47	...	...	...	47	0	...	George T. Harrell, M.D., Dean	1
N.J.	2	Seton Hall College of Medicine and Dentistry, Jersey City	Pri	1956	950	950	9-11-57	2	80	...	...	...	80	0	...	Charles L. Brown, M.D., Dean	2
N.Y.	3	Albert Einstein College of Medicine, New York City	Pri	1955	1,050	1,050	9-16-57	Degree	96	55	...	...	151	0	...	Marcus D. Kogel, M.D., Dean	3
		Totals							223	55	...	...	278	0	...		
		Grand totals (Four-year schools and schools of basic medical sciences)							8,014	7,259	7,023	6,834	29,130	160	6,796		

* Schools developing new programs not yet eligible for full approval included at the end of the table.
† Pub = Public; Pri = Private.

has produced data that are not sufficiently comparable with information published in previous years to allow reducing this information to a quantitative, tabular form. The lack of a uniform system of accounting results in instances of inclusion of items in the report of one institution which in another school may appear in a different category or even be omitted entirely. The quantitative data that usually is given in this section of the annual report on medical education will no longer be presented until there is more assurance as to its completeness and validity.

Giving due regard to these qualifications, information available strongly suggests that there has been a substantial increase in funds available for the support of medical school activities and these funds from all sources amount to considerably more than 200 million dollars. It is evident that the change in form and content of this year's inquiry brought forth information of income that was not presented in previous years, even though an unknown amount of it was probably available in those prior years. It also seems very likely that the amount of support from customary government and many nongovernment sources is now greater than it has been in the past. This increase cannot be accounted for solely by funds anticipated for the newly developing schools.

In another section of this report (The Search for Costs of Medical Education), reference is made to the potential values of the development of a uniform cost accounting system in medical schools. Without such a system, it seems unlikely that it will be possible to ascertain reasonably the total expenditures of medical schools or to present a feasible estimate of the costs of separate functions of these institutions.

SEARCHING FOR THE COST OF MEDICAL EDUCATION

The costs of supporting the activities of medical schools have risen steadily concomitant with an expansion of those activities and the general increase in the price of services and goods characteristic of the times. All funds available for the various functions of our schools place the total operation above the level of a 200-million-dollar-a-year business. Since so much of these funds is derived either directly or indirectly from public sources, there exists an obligation to render as meaningful an accounting of expenditures as is possible.

Other large business enterprises have found it of value to utilize a functional system of cost accounting. The buyer, seller, manufacturer, and stockholder in the automobile industry all benefit from knowledge of the costs of the component parts of the automobile as well as the budgets of the various departments which made the components. There should be similar values to all concerned in knowledge of the costs of the various functions of a medical school as well as the budgets of the departments within the school.

TABLE 4.—*Approved Medical*

Province		Approved Medical Schools	Year Organized	Tuition: Resident	Tuition: Non-Resident	1957-1958 Academic Year	Pre-Medical Requirements by Yr.
Alta.	1	University of Alberta Faculty of Medicine, Edmonton	1913	$351.25	$351.25	9- 3-57	2
B.C.	2	University of British Columbia School of Medicine, Vancouver	1949	445	445	9- 1-57	3
Man.	3	University of Manitoba Faculty of Medicine, Winnipeg	1883	486	486	9- 9-57	3
N.S.	4	Dalhousie University Faculty of Medicine, Halifax	1867	531	731	9- -57	3
Ont.	5	Queen's University Faculty of Medicine, Kingston	1854	545	545	9-10-57	3
	6	University of Ottawa Faculty of Medicine, Ottawa	1945	524.50	524.50	9- 4-57	3
	7	University of Western Ontario Faculty of Medicine, London	1881	585	585	9-10-57	3
	8	University of Toronto Faculty of Medicine, Toronto	1843	591.50	591.50	9-25-57	2
Que.	9	McGill University Faculty of Medicine, Montreal	1823	650	650	9- 4-57	3
	10	University of Montreal Faculty of Medicine, Montreal	1843	418	498	9-10-57	Degree
	11	Laval University Faculty of Medicine, Quebec	1848	520	520	9- 4-57	Degree
Sask.	12	University of Saskatchewan College of Medicine, Saskatoon	1926	470.50	470.50	9-25-57	2
		Totals					

* Intern and premedical figures not included.
† 67 Intern year & 49 fourth year graduates.

Emory University and the State University of New York have recently undertaken a cost analysis of the functions of their medical centers. Both studies are designed to identify the costs of such activities as undergraduate, graduate, and postgraduate medical instruction; nonmedical instruction; research; patient services; and other community services. The Emory study is limited to expenditures recorded in Emory University accounts. The State University of New York project involves a comparative analysis of costs in 9 private and 10 state university medical colleges.

In the report of its pilot study, the Emory group anticipates that the data derived will be of value in the following areas:

1. In informing the university and its benefactors why the medical center program is costly, what is being accomplished with funds, and in what other areas further support is needed.

2. In examining expenditures in terms of program objectives and in determining whether funds are being expended in accordance with the relative importance of these objectives.

3. In suggesting areas for careful study directed toward effecting savings or strengthening certain programs.

4. In developing a realistic base for the consideration of financial relationships between the school of medicine, its associated hospitals, other schools or departments of the university, as well as outside agencies with which the school cooperates.

5. In determining overhead chargeable to contract research and other services provided to outside agencies.

6. To assist in the preparation of budgets particularly when a change in programs is contemplated.

7. If and when an acceptable, uniform cost analysis method is devised, comparisons of cost among several medical schools, properly performed and interpreted, can point to management differences that would merit study. In such comparisons, careful consideration would have to be given to differences in important factors that effect cost, e. g., nature of programs, student enrollment, salary scales, location and types of physical facilities, and the relationship of the school to its university, affiliated hospitals, etc.

The beginning already made suggests that the complexity of a medical center can lend itself to this useful fiscal approach. The reports of these studies will be of great interest and potential value to all medical educators and university business officers. It seems likely that the usefulness of this tool will attract the cooperative response of other medical schools. Perhaps in the near future it may even be possible to suggest a reasonably fair sum as representative of what it costs to educate a medical student.

SCHOLARSHIP AND LOAN FUNDS

Medical schools were asked to stipulate the total capital value of funds administered by the medical school for scholarships. All but 3 of the 85 returns were usable. Capital holdings for scholarships total more than 11 million dollars. The 5 schools with greatest holdings account for 36% of this sum, and the 10 schools with greatest holdings account for 55%. It is to be emphasized that these data deal with capital rather than available funds. It is of interest to point out that the three unusable returns were all from privately owned institutions. Pertinent data are given in table 5. The schools in this table are ranked alphabetically rather than by amount of holdings.

Schools were also asked for the total capital value of funds administered by the school for student loans. Usable returns were received from all but six schools, all of which are privately owned. Data similar to those presented for scholarship funds are given in table 6. Again it is to be noted that these are capital rather than available funds and that the schools are listed alphabetically.

It is interesting to note that Harvard, Michigan, and University of California, Los Angeles, are among the top 10 schools in capital holdings for both scholarships and loans. Twelve schools reported no capital funds for scholarships and two schools reported none for loans.

An inquiry conducted in October, 1956, indicated that approximately one-third of available sums for scholarships was derived from endowed funds, one-third from tax sources (usually state government), and one-third from all other sources (alumni, state and county medical societies, etc.). This suggests that funds available for expenditure for scholarships are greater than would be the usual return on an 11-million-dollar investment. The data from this inquiry are dealt with in an interesting article in the June, 1957, issue of the Student American Medical Association publication, *The New Physician*,[19] entitled "The Misplaced Monies of Medical Education."

NATIONAL SCIENCE FOUNDATION RESEARCH REVIEW

The National Science Foundation has completed a group of surveys on the dollar volume and manpower resources in research for the year 1953-1954.

Schools in Canada

Students by Classes 1956-1957								Part time and Irregular Students	Graduates 7-1-56 to 6-30-57		
1st Pre-medical Yr.	2nd Pre-medical Yr.	1st Yr.	2nd Yr.	3rd Yr.	4th Yr.	Required Intern Yr.	Total				
...	...	60	57	46	49	...	212	0	42	John W. Scott, M.D., Dean	1
...	...	60	51	48	50	...	209	0	48	John W. Patterson, M.D., Dean	2
...	...	68	62	51	49	67	230*	0	116†	Lennox G. Bell, M.D., Dean	3
...	...	61	53	54	55	49	223*	0	49	C. B. Stewart, M.D., Dean	4
56	54	58	55	50	56	...	219*	0	56	G. Harold Ettinger, M.D., Dean	5
27	34	68	62	42	50	...	222*	1	50	Jean-Jacques Lussier, M.D., Dean	6
...	...	60	51	57	58	...	226	0	54	J. B. Collip, M.D., Dean	7
134	121	149	152	124	140	...	565	0	139	J. A. MacFarlane, M.D., Dean	8
...	...	116	102	110	97	...	425	0	97	Lloyd G. Stevenson, M.D., Dean	9
...	...	124	108	103	110	...	445	0	100	Wilbrod Bonin, M.D., Dean	10
...	...	141	144	131	122	113	538*	0	113	Jean-Baptiste Jobin, M.D., Dean	11
...	...	36	37	39	29	...	141	0	29	J. Wendell Macleod, M.D., Dean	12
217	269	1,001	934	855	865	229	3,655	1	893		

The foundation has been publishing monthly reviews of their data and two of these [19] contain information of particular interest and pertinence to medicine.

It is noted that, although colleges and universities are not major contributors to total research from a dollar standpoint, because a large portion of their research is basic, such institutions do wield a very significant influence upon total research. The survey covered universities granting advanced degrees in science and included those having professional schools (independent medical schools were also included). There were 190 such institutions and usable responses were obtained from 173.

TABLE 5.—*Capital Funds for Scholarships*

Total — $11,200,000	% Held
Columbia University	36
Harvard Medical School	
University of Rochester	
University of Virginia	
Washington University	
University of Michigan	55
University of California, Los Angeles	
University of California, San Francisco	
University of Washington	
Woman's Medical College	
Publicly owned schools	35
Privately owned schools	65

During the year reported, these institutions expended 278 million dollars in the physical (mathematics, engineering, physics, and chemistry); life (biological and medical preclinical and clinical); psychological and social sciences. It is estimated that the 17 nonresponding universities and the 930 liberal arts and teachers colleges would have raised this total to approximately 285 million dollars.

Separately budgeted research in universities sponsored by the federal government, industry, private foundations, or the institutions themselves accounted for approximately three-fourths of the total. In this category, 70% of the total support was from the federal government. Sixty per cent of the separately budgeted research was in the physical sciences, 30% in the life sciences, and 10% in others.

The survey indicates that research in medical schools accounts for approximately two-thirds of the total dollars expended by colleges and universities for research in the life sciences. From estimates available, it appears that medical schools as a group spent at least one dollar on research for each dollar of instructional expense.

As was true in the over-all university survey, separately budgeted research in medical schools accounts for most (68%) of the total. The federal government provided approximately half of the support for this category of research in medical schools as opposed to 70% in the universities proper.

The National Science Foundation estimated the indirect costs associated with research in both the university and the medical school surveys. The formula used was based on Section XV, Contract Cost Principles, Armed Services Procurement Regulations and was the one generally used by the Department of Defense and certain other federal agencies. It establishes the rate for computing indirect costs based on the total salary and wage expenditures of the project. In this study the median rate was found to be 40% of the total salary and wage expenditures that are made as a direct project charge.

In the university study, the sponsoring agency provided 58% of the indirect costs for separately budgeted research and the university provided 42%. In the medical school study, the sponsoring agency provided only 27% of indirect costs and the medical schools 73%. For the survey year, this medical school contribution was estimated to be slightly more than 9 million dollars.

These reviews of the National Science Foundation identify sources of funds and costs of research in an interesting and illuminating manner. They and the forthcoming monograph that will present a more detailed report are recommended to all concerned in this important aspect of medicine. Since the data are for the year 1953-1954, the funds involved are now significantly greater, but the pattern of distribution presented should continue to be of essentially the same degree of validity.

AMERICAN MEDICAL EDUCATION FOUNDATION

In order to acquaint readers with the current status and activities of the American Medical Education Foundation the following report has been prepared by its Executive Director.

During the seven years of its existence, the American Medical Education Foundation has received more than 6 million dollars from the medical profession, both individually and through its medical societies, for distribution in unrestricted gifts to the nation's medical schools. Its continued progress and successful development have assured for it a unique position in education as the first concrete concern of an entire profession for the financial welfare of its schools.

TABLE 6.—*Capital Funds for Loans*

Total — $6,200,000	% Held
College of Medical Evangelists	37
Harvard Medical School	
University of Minnesota	
University of Pennsylvania	
Western Reserve University	
Cornell University	52
University of Michigan	
Stanford University	
University of Kansas	
University of California, Los Angeles	
Publicly owned schools	47
Privately owned schools	53

During the calendar year of 1956, 39,892 contributors gave the foundation $1,072,727, an increase of 40% over the income of 1955. This amount

formed the funds for the grants which the foundation distributed to the medical schools on Feb. 11, 1957, increasing the total to $5,756,678 that the medical schools have now received from the foundation.

This substantial amount of money does not fully represent the real value that the American Medical Education Foundation has been to the medical schools during its existence. Since 1951 it has conducted a public relations campaign, using advertising and publicity to supplement local committees, that has focused attention upon the serious problems connected with the financial support of the nation's medical schools. In addition, during its first five years, it transferred its donations to the National Fund for Medical Education for distribution. These donations, representing almost half of the amount given in grants by the National Fund, were of great assistance to that organization in developing its appeal to industry and other segments of society.

The American Medical Education Foundation has also had a stimulating effect on the development of alumni programs by individual schools. Since 1952 the foundation has collected and tabulated reports from the schools on the contributions made to them by physician alumni. This information has been helpful not only in evaluating the effectiveness of each school's program but also by helping to coordinate the campaigns of the alumni programs with the efforts of local medical society committees working on behalf of the foundation. For the past three years the American Medical Education Foundation has included in its appeals the statement "Give to the American Medical Education Foundation or give to your medical school but give." It has also held several meetings with school representatives in an effort to stimulate further the coordination and effectiveness of such alumni programs with the American Medical Education Foundation's national campaign. Recently it has moved to organize a committee made up of representatives from the medical school deans, the schools' development officers, and the state volunteer chairmen for the foundation to study the problems and explore the possibilities of such coordination.

The activities described above coupled with the desire to publicize more effectively its efforts prompted the decision of the foundation to discontinue its previous methods of distributing its income through the National Fund. It therefore made its first direct grants to the medical schools on Feb. 11, 1957, being careful, however, to coordinate the dates and publicity with the National Fund so that the two organizations' continued cooperation would be emphasized. The board of directors of the foundation worked out a simple grants program based on an equal division of the $551,425 of undesignated money available. The four-year schools received a basic grant of $6,850; the schools with only first-year and second-year classes enrolled received grants of $3,425. In addition to this, $520,940 designated by contributors for specific schools was properly distributed as added grants to those schools.

The announcement of this new grants program received some criticism because of an arrangement that had been made by the National Fund with the Ford Foundation, whereby that foundation would match a portion of the undesignated income of the fund according to a percentage formula. This, of course, would have applied to the American Medical Education Foundation's undesignated donations if the previous distribution method through the National Fund had continued. For this reason the Board of Directors of the American Medical Education Foundation appealed to its sponsoring organization, the American Medical Association, to make up the estimated amount which the schools would lose as a result of American Medical Education Foundation's income not participating in this matching arrangement. The Board of Trustees of the American Medical Association granted this request by making an additional gift of $125,000 to the American Medical Education Foundation.

It was in this very area of criticism, however, that the wisdom of the board of directors in making its decision to distribute grants separately has become increasingly apparent. The emphasis on undesignated funds in the Ford matching formula had a disruptive effect on the development of the alumni programs so recently started in many schools. The subsequently better relations which have been previously described were some of the direct results of this decision.

During the early part of 1957, the expanding volume of interest in the American Medical Education Foundation and the greater understanding of the financial problems of its schools by the medical community assures the continuation of this organization and its value to medical education.

THE NATIONAL FUND FOR MEDICAL EDUCATION

The National Fund for Medical Education in January awarded grants totaling $3,066,450 to the medical schools. This was the largest annual award in the fund's history and brought to $12,066,591 the total awarded since 1951 when the first awards were made.

Each four-year school received $15,000 plus $65 per student. Four two-year schools received $7,500 plus $65 per student and the two schools in the process of becoming four-year schools received $11,250 plus $65 per student.

The number of corporations contributing to the fund in 1956 totaled 1,737, a new high. They gave $1,862,115 compared to $1,682,508 given by 1,525 firms in 1955. The Ford Foundation contributed $1,393,907 under its "matching" arrangement with the fund.

(Under the Ford Foundation's arrangement with the fund, all unrestricted fund receipts in 1956, up to the previous year's total, were matched 70%, and

everything over that was matched 100%. This year the receipts up to last year's total will be matched 60%, and the balance 100%. Each year, the matching percentage for receipts up to the previous year's total will diminish, under an agreed formula, but the percentage for everything over the previous year's total will remain at 100.)

In November, 1956, the fund joined with the Association of American Medical Colleges and the American Medical Association in presenting the fourth Frank H. Lahey Memorial award to Colby M. Chester, honorary chairman, General Foods Corporation, and chairman of the fund's Committee of American Industry. The award is given annually to a layman for "distinguished services to medical education." Previous recipients were President Eisenhower, former President Hoover, and Abraham Flexner. The 1957 award was presented to Alfred P. Sloan Jr., at a dinner in New York City at which President Eisenhower was the principal speaker.

TABLE 7.—*Budgeted Unfilled Full-Time Faculty Positions in Medical Schools of the United States, 1956-1957*

Department	No. of New Positions					No. of Old Positions					Total Old and New Positions
	Instructor	Assistant Professor	Associate Professor	Professor	Total	Instructor	Assistant Professor	Associate Professor	Professor	Total	
Basic Medical Sciences											
Anatomy	4	4	1	—	9	3	—	5	5	13	22
Biochemistry	4	—	—	—	4	4	3	3	3	13	17
Physiology	2	2	1	1	6	6	3	3	3	15	21
Pharmacology	—	2	3	1	6	4	5	2	—	11	17
Microbiology	3	4	1	1	9	3	4	2	—	9	18
Pathology	2	6	8	2	18	5	13	7	3	28	46
Comparative biology	—	2	—	1	3	—	—	—	—	—	3
Subtotals	15	20	14	6	55	25	28	22	14	89	144
Clinical Fields											
Medicine	9	7	4	—	20	6	3	—	—	9	29
Surgery	9	8	6	1	24	6	4	2	6	18	42
Obstetrics and gynecology	1	1	1	2	5	2	5	—	1	8	13
Pediatrics	1	5	2	2	10	—	5	5	1	11	21
Psychiatry	2	5	1	4	12	2	6	6	3	17	29
Preventive Medicine	—	3	2	2	7	2	2	3	5	12	19
Anesthesiology	2	—	—	—	3	—	1	—	2	3	6
Dermatology	1	—	—	—	1	1	—	—	—	1	2
Neurology	2	—	—	—	2	—	2	1	—	3	5
Orthopedics	—	—	—	—	—	1	—	1	1	3	3
Otolaryngology	—	—	—	1	1	—	—	—	—	—	1
Physical Medicine	1	—	—	—	1	3	—	—	—	3	4
Subtotals	29	32	18	14	93	24	32	19	19	94	187
Totals	44	52	32	20	148	49	60	41	33	183	331

In its public relations and fund-raising activities, the fund is seeking to build a bridge of understanding between industry and medical education. In cooperation with the International Harvester Foundation and the United States Steel Foundation, Inc., the fund held an all-day meeting on "Tomorrow's Challenges to the Medical Sciences," at the University of Chicago, March 5. James B. Conant, former president of Harvard University and more recently ambassador to West Germany, chaired the meeting, which drew an audience of 97, representing America's leading corporations.

There were three panels, one each on The Implications of Nuclear Physics for the Medical Sciences, The Impact of the Behavioral Sciences on Medical Education, and Medical Education Looks to the Future. A report on this conference will be available this fall.

In April, the fund published a 6,000-word brochure, "For Lasting Security," showing the close link between medical education and the nation's health and security. It discusses (1) the rise of American medical schools to front rank in world medicine, (2) the role of the schools in advancing the medical sciences, (3) the mounting problems of medical education, (4) industry's stake in medical education, (5) the current "struggle for solvency," and (6) the future of the nation's health.

Steady progress is being made, the fund reports, in alerting the American public—particularly corporations—to the problems of medical education. There is still, however, a wide lack of understanding of medical school policies and activities, particularly with respect to (1) admissions policies, (2) the so-called doctor shortage, (3) the wide range of medical school activities and responsibilities, and (4) medical school finances.

At a board meeting of the fund in April, the hope was expressed that the joint efforts of the American Medical Association, the Association of American Medical Colleges, and the Fund, which made possible a successful Medical Education Week, will result in the clearing up of public misunderstanding on all these medical problems.

FULL-TIME FACULTY POSITIONS UNFILLED, 1956-1957

There has been increasing concern during recent years over the difficulties which some schools have encountered in filling all of the old and newly budgeted full-time faculty positions. Consequently, the annual questionnaire on Medical School Statistics (1956-1957) included an inquiry regarding the number of budgeted new and old full-time faculty positions for which the medical school had been unable to obtain personnel during the year. Table 7 presents a summary of the results of this inquiry. The material is arranged so as to indicate departments, rank, and whether the vacancies were in newly created or old positions for which funds had been budgeted.

The total of 331 unfilled positions represents a considerable increase over the report of 258 in 1954 and 251 in 1955. Unfilled posts in the basic medical sciences increased from 108 in 1955 to 144 in 1956, with the greatest need being reported in pathology. The clinical areas reported an increase of unfilled full-time positions from 143 in 1955 to 187 in 1956, with the largest group represented by surgery. It is of interest to note that no unfilled full-time positions were reported for ophthalmology in 1956-1957. About half of the unfilled positions represented newly created posts. Of the over-all total of 331 unfilled full-time positions, 93 represented instructorships, 112 assistant professorships, 73 associate professorships, and 53 were professorships.

Thus, there continues to be a substantial number of budgeted new and old full-time faculty positions for which schools have not been able to make satisfactory appointments during the year. This represents an increase of approximately 30% over the unfilled faculty full-time positions reported two years ago. This increase is somewhat difficult to analyze, for many factors are involved. New schools are in the course of development and have opened a number of new full-time positions. Older established schools in some instances are in transition from almost completely voluntary and part-time clinical faculty to nuclei of full-time clinical faculty personnel and, in other instances, have created new departments and chairs to man them. The two departments reporting the largest number of unfilled full-time positions (pathology and surgery) are both in areas where economic competition in the form of laboratory activities or private practice may play a role of considerable significance. Regardless of the factors involved, the problem of obtaining and maintaining adequate full-time faculty personnel for those disciplines where such personnel are essential to the teaching and research activities of modern medical schools represents a constant and increasingly difficult challenge.

GROSS CHARACTERISTICS OF THE CLINICAL CURRICULUM

In last year's report, certain national characteristics of the curriculum in the basic medical sciences were presented as an aid to the many medical schools undertaking curriculum study and revision. The medical school questionnaire, which largely serves as the basis for the current report, included questions relevant to the allocation of scheduled hours during the last two years of the curriculum.

Data pertinent to the five major clinical disciplines are presented in tabular form. For each column of the tables in this section of the report the average hour allocations (reduced to the nearest multiple of five) and the ranges from which the averages were obtained are presented for the five schools with the maximum assignment of hours, for the five schools with the minimum assignment of hours, and for the five schools with hour assignments that placed them in a median position. All data presented were derived from the reports of 51 medical schools whose returns were considered usable. Returns were rejected when they were not adequately specific for all of the curriculum components studied. It is believed that the returns used represent a reasonable sampling of the total schools queried.

This material should readily lend itself to a comparative study of curriculum structure. Such study should be undertaken with the understanding that the data presented here purport to represent scheduled hour allocations as reported by the schools for a typical, individual student. Utilization of free, elective, or unscheduled hours during evenings and week-ends is not intended to be included.

TABLE 8.—*Total Scheduled Hours Allocated to Major Clinical Departments for Combined Third and Fourth Years*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	1,505(1,619-1,351)	1,105(1,135-1,072)	720(824-576)	695(792-653)	435(560-364)
Median 5	945(957-930)	770(779-713)	430(440-410)	465(486-424)	210(234-198)
Minimal 5	535(604-392)	310(367-195)	235(268-193)	260(301-156)	55(66-40)

TABLE 9.—*Third-year Curriculum by Total Scheduled Hours Allocated to Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	805(964-692)	625(762-566)	445(608-380)	420(645-306)	280(303-264)
Median 5	490(500-470)	405(409-397)	215(229-204)	165(177-158)	155(162-145)
Minimal 5	225(265-120)	110(141-30)	30(55-0)	8(22-0)	25(33-16)

TABLE 10.—*Fourth-year Curriculum by Total Scheduled Hours Allocated to Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	895(1,154-760)	725(1,080-621)	440(580-330)	540(579-409)	240(349-238)
Median 5	440(450-429)	335(350-319)	215(231-195)	275(289-265)	75(82-72)
Minimal 5	205(272-156)	135(176-59)	15(65-0)	35(118-0)	5(11-0)

The total hours scheduled for each of the major clinical departments during both of the last two medical school years are presented in table 8. The wide swings between the hour assignments for the averages of the maximum and minimum groups attest in part to the great variation of content and method that characterizes medical education in the United States. At the same time it is interesting to note that the relative percentage of total scheduled hours assigned to each discipline remains reasonably constant between the maximum, median, and minimal group averages. In the last two medical school years, from 32 to 35% of scheduled time is allocated to medicine, 21 to 27% to surgery, 15 to 16% to pediatrics, 10 to 18% to obstetrics and gynecology, and 4 to 10% to psychiatry.

CLINICAL CURRICULUM BY TOTAL SCHEDULED HOURS ASSIGNED TO MAJOR DEPARTMENTS

Tables 9 and 10 present hour assignment by major clinical subjects separately for the third and fourth years. In medicine, surgery, and pediatrics most often there appears to be approximately equal

amounts of scheduled time between the third and fourth years. Obstetrics-gynecology most often has a greater hour assignment in the fourth year and psychiatry in the third year. The range of hours from which the average was derived in the minimal groups in both tables indicates that no time is scheduled during the year concerned in some of the departments. In each instance this is reflected by the major hour assignment in that department for the alternate year. As shown in table 8, although some institutions have surprisingly few scheduled hours in certain of these clinical areas, all schools do have some scheduled time in each of them.

CLINICAL CURRICULUM BY SCHEDULED HOURS OF WHOLE CLASS EXERCISES

The scheduled hours utilized for exercises involving the class as a unit during the third and fourth years are presented in tables 11 and 12.

TABLE 11.—*Third-year Curriculum by Scheduled Hours of Whole Class Exercises in Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	250(330-216)	245(314-194)	125(140-108)	130(166-108)	70(140-84)
Median 5	115(117-108)	100(108-96)	35(36-35)	50(57-44)	20(22-22)
Minimum 5	20(33-0)	5(22-0)	0(0-0)	0(0-0)	0(0-0)

TABLE 12.—*Fourth-year Curriculum by Scheduled Hours of Whole Class Exercises in Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	200(361-152)	155(180-140)	110(142-80)	90(120-71)	65(92-54)
Median 5	75(83-68)	50(55-46)	10(13-8)	35(36-30)	6(3-0)
Minimum 5	0(0-0)	0(0-0)	0(0-0)	0(0-0)	0(0-0)

TABLE 13.—*Third-year Curriculum by Scheduled Lecture Hours in Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	180(308-136)	165(215-136)	65(68-61)	90(126-72)	65(83-45)
Median 5	50(60-45)	55(64-46)	30(32-28)	35(36-30)	15(18-16)
Minimum 5	0(0-0)	5(15-0)	0(0-0)	0(0-0)	0(0-0)

TABLE 14.—*Fourth-year Curriculum by Scheduled Lecture Hours in Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	85(108-77)	85(108-60)	40(60-33)	40(44-33)	30(33-20)
Median 5	10(17-0)	5(36-0)	0(0-0)	0(0-0)	0(0-0)
Minimum 5	0(0-0)	0(0-0)	0(0-0)	0(0-0)	0(0-0)

Comparison of these two tables confirms that the number of such exercises diminishes in the fourth year and the percentage of assigned hours utilized in this manner is also decreased in the fourth year. It is interesting to note that as the total scheduled hours allocated to a department is diminished, in general a relatively smaller portion of that time is devoted to exercises for the class as a unit.

For the combined third and fourth year, the hours scheduled for whole class instruction ranged from 1,054 to 130. Although all institutions indicated some scheduled time for this in the third year, three schools reported no scheduled hours for meetings of the entire class in the fourth year.

Reporting institutions were asked to specify the nature of exercises held for entire classes. Because of the current interest in the role of the lecture, data obtained in regard to it are summarized in tables 13 and 14. In the third-year curriculum, most often half or more of hours for whole class instruction are in the form of lectures. In the fourth year the vast majority of whole class teaching is in the form of clinical conferences, clinical pathological conferences, etc., and not lectures.

CLINICAL CURRICULUM BY SCHEDULED HOURS FOR INPATIENT CLERKSHIPS

Other gross characteristics of the clinical curriculum for which information was requested were scheduled hour allocations for inpatient and outpatient clerkships. This material for impatient scheduled hours is given in tables 15 and 16.

As would be anticipated, the greatest hour assignments for inpatient clerkship activities are in the third year. In medicine, 83% of the reporting schools have more inpatient hours scheduled in the third than in the fourth year. The same general pattern exists in surgery (73% of schools with greater inpatient assignment in third year), pediatrics (63%), and psychiatry (75%). The pattern is reversed in obstetrics-gynecology, with 60% of the schools indicating greater hour assignments for inpatient study in the fourth year.

While the emphasis on third-year inpatient activity demonstrated in table 15 (3rd year inpatient clerkship hours) is not unexpected, the amount of such activity in most schools as shown in table 16 (4th year inpatient clerkship) perhaps would not have been anticipated.

CLINICAL CURRICULUM BY SCHEDULED HOURS FOR OUTPATIENT CLERKSHIPS

Tables 17 and 18 present data on scheduled hours of outpatient assignments in the third and fourth years. Major allocations of hours for this activity in the five clinical departments occur in the last school year. Comparison of these data with those

for the inpatient clerkship makes it readily apparent that study of the ambulant patient has been assigned considerably less scheduled time than is true for study of the hospitalized patient.

Since it is likely that psychiatry may have a significant role in time assigned to other departments, it is not possible to evaluate the relatively minor role it has been given in hours specifically allocated to it, particularly in the outpatient function.

As a source of ready reference, scheduled hour assignments of the major basic science departments are presented in table 19 and those of the major clinical departments in table 20. It is to be emphasized that in each instance the data reflect the average hours of the five medical schools whose hour assignments placed them in a median position. Table 19 (basic science departments) was derived from last year's report and presents assignments of basic science departments in the first and second year of the curriculum. Table 20 (clinical departments) presents assignments of clinical departments in the third and fourth years. In neither instance do the data reflect any assignments outside of the two years indicated.

TABLE 15.—*Third-year Curriculum by Scheduled Hours Inpatient Clerkship in Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	635(762-570)	470(540-408)	325(384-288)	285(303-237)	220(264-192)
Median 5	325(338-320)	235(240-225)	150(160-138)	70(96-49)	65(72-55)
Minimum 5	40(103-0)	0(0-0)	0(0-0)	0(0-0)	0(0-0)

TABLE 16.—*Fourth-year Curriculum by Scheduled Hours Inpatient Clerkship in Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	500(756-400)	485(576-429)	265(362-213)	400(544-348)	185(240-151)
Median 5	120(150-94)	145(150-135)	10(12-4)	165(171-156)	0(0-0)
Minimum 5	0(0-0)	0(0-0)	0(0-0)	0(0-0)	0(0-0)

TABLE 17.—*Third-year Curriculum by Scheduled Hours Outpatient Clerkship in Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	120(261-63)	135(150-120)	130(190-58)	150(303-60)	70(110-54)
Median 5	0(0-0)	0(0-0)	0(0-0)	0(6-0)	0(0-0)
Minimum 5	0(0-0)	0(0-0)	0(0-0)	0(0-0)	0(0-0)

TABLE 18.—*Fourth-year Curriculum by Scheduled Hours Outpatient Clerkship in Major Clinical Departments*

Schools	Medicine	Surgery	Pediatrics	Obst.-Gynec.	Psychiatry
Maximum 5	535(793-363)	360(408-297)	235(280-201)	195(270-140)	140(176-108)
Median 5	185(198-176)	95(104-91)	110(117-101)	50(54-42)	0(0-0)
Minimum 5	25(54-0)	0(0-0)	0(0-0)	0(0-0)	0(0-0)

It is not the purpose of this study of certain quantitative characteristics of the curriculum to undertake an interpretative analysis of the data. Such an analysis would require a full knowledge of the total curriculum and, even more important, acquaintance with the many vital qualitative factors which this study has not taken into account. It is hoped that this material will provide certain quantitative landmarks to medical schools as they continuously review and evaluate their educational programs.

TABLE 19.—*Average Scheduled Hours of First and Second Year for Major Basic Science Departments of Five Schools in Median Range*

Department	Av. Hr.	Range of Median Schools
Anatomy	605	(607-597)
Biochemistry	230	(234-224)
Physiology	256	(256-256)
Pharmacology	165	(168-163)
Microbiology	225	(232-218)
Pathology	310	(315-308)

The information presented in this and last year's study clearly indicates the tremendous variation from school to school in the time allocated to the major departments. The status of medical education in this country serves as ample evidence of the values of adapting the programs of our medical schools to best meet the characteristics of each school's students, faculty, and available facilities.

TEACHING RESPONSIBILITIES FOR OTHER THAN UNDERGRADUATE MEDICAL STUDENTS 1956-1957

All except one of the medical schools in the United States and all but one of the Canadian medical schools report teaching responsibilities for other students in addition to undergraduate medical students. These include students in dentistry; nursing; pharmacy; x-ray and medical technology; arts and sciences courses; such other students as those in physical therapy, occupational therapy, medical records, and medical librarianship; medical school graduates in internships and residencies in the teaching hospitals of the schools; fellows not otherwise designated; and physicians in continuing or postgraduate medical education.

TABLE 20.—*Average Scheduled Hours of Third and Fourth Year for Major Clinical Departments of Five Schools in Median Range*

Department	Av. Hr.	Range of Median Schools
Medicine	945	(957-930)
Surgery	770	(779-713)
Pediatrics	430	(440-410)
Obst.-Gynec.	465	(486-424)
Psychiatry	210	(234-198)

TABLE 21.—*Teaching Responsibilities for Other Than Undergraduate Medical Students, 1956-1957*

UNITED STATES SCHOOLS	Undergraduate or Basic Professional, No. Enrolled						Professional, No. Enrolled (Not Candidates for Advanced Degrees)					
	Dental Students	Pharmacy Students	Nurses	Technical Students	Arts and Science Majors	Other	Candidates for Advanced Degrees, No. Enrolled	Interns	Residents	Fellows (not otherwise designated)	Postgraduate Continuation Enrollments	Other
Medical College of Alabama	190	0	90	36	0	56	31	33	87	25	0	
University of Arkansas	0	0	22	40	0	0	15	24	52	0	0	
College of Medical Evangelists	104	0	60	17	0	0	16	..	..	..	..	
University of Southern California	0	0	0	0	0	0	80	150	150	15	0	
Stanford University	0	0	100	23	71	40	40	118	103	46	26	
University of California, Los Angeles	0	0	0	0	0	0	41	46	47	113	1,802	
University of California, San Francisco	275	240	179	46	0	0	79	41	190	14	1,637	
University of Colorado	0	0	190	13	28	16	32	48	199	0	3,575	
Yale University	0	0	326	9	0	58	83	43	119	73	150	
Georgetown University	382	0	191	0	0	0	99	9	115	18	0	
George Washington University	0	5	0	0	105	0	6	24	52	9	0	
Howard University	152	77	28	25	10	3	10	18	42	7	0	
University of Florida	0	0	47	0	0	0	4	0	0	0	0	
University of Miami	0	0	0	0	0	0	16	55	105	19	0	
Emory University	299	0	78	12	0	9	20	68	183	23	1	
Medical College of Georgia	0	0	0	0	0	0	2	3	78	4	1	
Chicago Medical School	0	0	0	0	0	0	..	0	0	0	0	
Northwestern University	0	0	250	39	0	6	41	0	131	7	107	
Stritch School of Medicine	10	0	0	0	0	0	44	12	21	2	0	
University of Chicago	0	0	0	0	0	0	116	42	130	46	35	
University of Illinois	225	81	24	0	0	21	70	32	121	20	106	
Indiana University	140	..	802	93	564	..	4	27	116	17	..	
State University of Iowa	55	36	113	57	49	76	66	20	169	2	0	
University of Kansas	0	40	142	74	267	261	39	19	105	14	2,588	
University of Louisville	217	0	86	10	1	6	21	22	84	12	276	
Louisiana State University	0	0	45	0	0	11	11	56	145	11	75	
Tulane University	0	0	0	11	44	32	50	125	166	32	115	
Johns Hopkins University	0	0	0	0	0	9	5	0	0	0	0	
University of Maryland	1,104	58	184	4	0	8	20	40	93	24	8	
Boston University	0	0	140	39	56	0	36	0	12	0	0	
Harvard Medical School	56	0	0	0	0	0	84	0	0	0	401	
Tufts University School of Medicine	200	0	0	0	0	0	19	36	48	20	0	
University of Michigan	345	162	479	20	1,143	0	33	55	295	0	959	
Wayne State University College of Medicine	0	0	0	14	0	0	26	0	0	0	177	
University of Minnesota	271	41	83	595	308	362	130	38	150	0	1,246	
University of Mississippi	0	0	42	0	0	0	3	24	33	0	0	
University of Missouri	0	0	253	2	518	693	20	0	20	0	2	
St. Louis University	155	0	161	92	0	0	21	20	53	4	0	
Washington University	0	0	0	83	0	0	29	48	187	65	9	
Creighton University	93	0	0	0	1	0	5	0	0	0	0	
University of Nebraska	0	0	105	25	0	0	9	5	30	2	0	
Dartmouth Medical School	0	0	157	26	0	0	..	14	63	0	0	
Seton Hall College of Medicine	38	0	0	0	0	0	0	0	0	0	0	
Albany Medical College	2	0	82	36	0	23	8	43	88	..	700	
University of Buffalo	123	60	38	22	23	0	20	0	0	0	0	
Columbia University	148	0	302	0	0	823	35	0	0	65	600	
Cornell University	0	0	227	37	0	0	17	42	144	40	51	
Albert Einstein College of Medicine	0	0	0	0	0	0	2	44	157	26	0	
New York Medical College	0	0	185	0	0	0	..	109	20	0	29	
New York University	0	0	520	0	0	8	28	55	165	45	1,278	
State University of New York, New York City	0	0	0	0	0	0	9	196	330	30	34	38*
State University of New York, Syracuse	0	0	85	0	0	0	4	27	97	4	595	
University of Rochester	0	0	241	23	119	19	91	55	107	25	0	
University of North Carolina	198	117	118	11	20	6	37	27	85	8	6	
Duke University	0	0	304	33	0	44	2	51	156	18	0	
Bowman Gray School of Medicine	0	0	170	27	0	0	22	11	68	1	0	
University of North Dakota	0	0	131	18	9	47	15	0	1	0	0	
University of Cincinnati	0	0	0	0	0	0	32	52	142	28	0	
Western Reserve University	180	0	173	26	0	0	57	..	..	..	101	
Ohio State University	240	14	170	182	108	790	72	48	164	30	0	
University of Oklahoma	0	0	98	18	0	7	40	21	79	11	1,455	
University of Oregon	0	0	366	20	0	0	51	27	76	4	532	
Hahnemann Medical College	0	0	0	6	0	0	9	9	67	10	0	
Jefferson Medical College	0	0	265	25	0	0	14	0	0	0	0	
Temple University	0	0	259	24	0	0	15	15	124	0	0	
University of Pennsylvania	131	0	30	0	105	0	105	0	0	0	0	

TABLE 21.—*Teaching Responsibilities for Other Than Undergraduate Medical Students, 1956-1957*—Continued

	Undergraduate or Basic Professional, No. Enrolled						Professional, No. Enrolled (Not Candidates for Advanced Degrees)					
UNITED STATES SCHOOLS—Continued	Dental Students	Pharmacy Students	Nurses	Technical Students	Arts and Science Majors	Other	Candidates for Advanced Degrees, No. Enrolled	Interns	Residents	Fellows (not otherwise designated)	Postgraduate Continuation Enrollments	Other
Woman's Medical College of Pennsylvania	0	0	83	5	0	0	..	6	17	9	0	
University of Pittsburgh	0	0	927	0	0	0	13	6	236	6	516	
Medical College of South Carolina	0	101	172	4	0	0	9	15	54	7	0	
University of South Dakota	0	0	19	13	105	0	12	0	0	0	0	
University of Tennessee	201	188	47	21	0	0	41	0	0	0	0	
Meharry Medical College	120	0	80	18	0	15	..	10	23	0	0	
Vanderbilt University	0	0	0	0	0	24	15	28	84	14	0	
University of Texas Southwestern Medical Sch.	0	0	0	0	0	0	13	63	191	0	0	
University of Texas	0	0	206	46	0	0	31	36	102	10	126	
Baylor University	0	0	63	0	0	0	31	46	173	20	0	
University of Utah	0	20	48	22	76	0	51	26	56	8	1	
University of Vermont	0	0	55	27	0	0	6	17	37	1	0	
University of Virginia	0	0	0	6	0	0	7	29	74	20	0	
Medical College of Virginia	253	192	97	97	0	14	14	31	101	3	0	
University of Washington	226	110	469	99	1,109	242	92	87	81	72	309	
West Virginia University	0	80	0	20	0	2	11	0	0	0	11	
University of Wisconsin	0	195	280	171	305	0	50	20	75	2	2	
Marquette University	329	0	0	191	0	0	16	40	139	0	0	
University of Puerto Rico	0	0	54	59	0	2	..	0	0	2	0	
Totals	5,457	1,829	10,851	2,667	5,144	3,733	2,552	2,537	7,267	1,163	19,726	38
* 36 Graduate Students Psychiatry, 2 Unclassified Graduate Students.												
CANADA SCHOOLS												
University of Alberta	90	80	250	10	34	77	..	0	0	0	0	
University of British Columbia	0	0	118	25	127	6	..	..	..	..	..	
University of Manitoba	0	0	400	40	0	0	..	50	7	9	0	
Dalhousie University	36	23	44	0	27	0	..	50	41	2	0	
Queen's University	0	0	21	0	6	31	..	0	0	0	0	
University of Ottawa	0	0	20	0	0	0	..	2	0	6	1	
University of Western Ontario	0	0	93	0	0	0	..	98	26	12	2	
University of Toronto	392	96	36	70	318	271	..	86	34	89	153	
McGill University	..	..	..	..	..	..	..	..	..	..	..	
University of Montreal	95	120	0	67	0	146	..	97	0	0	22	
Laval University	0	0	0	83	0	0	..	111	0	0	0	
University of Saskatchewan	0	26	232	9	6	38	.	30	19	3	0	
Totals	613	345	4,214	304	518	569	..	524	127	121	178	

Table 21 portrays by school and student classification the educational responsibilities reported by the medical schools in the United States and Canada for students other than undergraduate medical students. The additional teaching responsibilities of the medical schools continue to increase. For the United States, such other students or enrollments totaled 62,899 or more than twice the total number of 29,130 medical students in 1956-1957. For Canadian schools, the total number of other students was 7,513 last year, as compared with 3,655 medical students.

The totals given in the table probably represent less than minimum real figures for the teaching responsibilities in addition to medical students. For example, inspection of the columns for interns and residents in the teaching hospitals of the medical schools in the United States reveals that 16 medical school reports listed neither interns nor residents, and another 4 schools reported residents but no interns. It would be expected that the educational program for interns and residents in the major teaching hospitals, at least, of the medical schools would require some time from the clinical faculty members of the schools. If there were added to the tabular totals in table 21 the numbers of interns and residents reported by just the major teaching hospitals of the medical schools reporting none, there would be 1,138 interns and 3,455 residents in addition to the 2,437 interns and 7,205 residents depicted in the table.

There is a similar lack of complete information supplied by the medical school administrators regarding the physician enrollments in postgraduate courses. Although 45 school reports presented zero physician enrollments in postgraduate courses, 18 of those schools last year had reported scheduling for 1956-1957 a total of 102 postgraduate courses for physicians. It would seem reasonable that some physicians enrolled in those courses and that some of each school's faculty and facilities were utilized.

TABLE 22.—*Advanced Degree Programs and Enrollment in the Basic Medical Sciences*

	MASTERS							DOCTORATES							POST-DOCTORATES							
	Anatomy	Biochemistry	Biophysics	Microbiology	Pathology	Pharmacology	Physiology	Anatomy	Biochemistry	Biophysics	Microbiology	Pathology	Pharmacology	Physiology	Anatomy	Biochemistry	Biophysics	Microbiology	Pathology	Pharmacology	Physiology	Total Enrollments
Medical College of Alabama	2	8	..	2	✓	1	2	✓	5	..	..	..	1	2	8	✓	..	..	✓	..	..	31
University of Arkansas School of Medicine	..	7	..	1	..	✓	1	..	2	..	✓	..	2	2	..	..	..	..	..	..	..	15
College of Medical Evangelists	2	7	..	4	..	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	16
University of Southern California School of Medicine	3	9	..	3	1	✓	5	✓	45	..	1	✓	4	7	✓	✓	..	✓	✓	2	✓	80
Stanford University School of Medicine	..	5	..	8	..	..	..	..	4	..	9	..	2	1	..	10	..	1	..	..	..	40
University of California, Los Angeles	2	1	1	..	7	1	3	9	8	8	..	..	2	6	..	..	..	..	..	..	..	48
University of California, San Francisco	6	2	..	✓	..	8	2	9	20	..	✓	..	2	22	8	✓	..	✓	..	✓	✓	79
University of Colorado School of Medicine	..	..	..	..	2	..	2	8	2	1	7	..	4	8	..	..	..	..	..	..	..	34
Yale University School of Medicine	✓†	1	..	4	..	✓	✓	2	13	..	9	..	3	2	..	..	..	..	..	..	..	34
Georgetown University School of Medicine	1	4	..	2	2	..	..	..	..	..	..	..	3	4	..	..	..	..	..	..	..	16
George Washington University School of Medicine	✓	18	..	15	..	3	11	4	13	..	24	..	4	7	..	..	..	..	..	..	..	99
Howard University College of Medicine	..	..	..	..	..	3	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
University of Florida College of Medicine	..	..	..	..	..	..	..	..	1	..	..	..	..	2	..	..	..	1	..	..	..	4
University of Miami School of Medicine	2	2	..	3	..	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10
Emory University School of Medicine	1	4	..	1	..	2	1	1	6	..	1	..	2	1	..	..	..	..	..	..	..	20
Medical College of Georgia	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Chicago Medical School	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Northwestern University Medical School	3	7	..	4	6	4	1	1	6	..	2	4	2	1	..	..	..	..	..	..	..	41
Stritch School of Medicine	7	4	..	6	..	6	8	3	4	..	1	..	3	2	..	..	..	..	..	..	..	44
University of Chicago	2	13	..	13	2	2	8	7	20	..	10	..	14	7	2	2	..	2	8	2	2	116
University of Illinois College of Medicine	2	12	..	3	3	9	10	4	10	..	4	1	3	5	..	4	..	..	✓	✓	✓	70
Indiana University School of Medicine	..	..	..	..	..	..	..	2	..	..	2	..	..	..	..	..	..	..	..	..	..	4
State University of Iowa College of Medicine	✓	4	..	4	..	5	7	6	8	..	5	..	5	19	..	..	..	..	..	..	..	63
University of Kansas School of Medicine	1	1	..	7	..	..	1	13	3	..	4	..	3	2	4	✓	..	1	..	..	✓	40
University of Louisville School of Medicine	1	6	..	4	..	..	3	..	4	..	1	..	1	1	..	..	..	..	..	..	..	21
Louisiana State University School of Medicine	..	4	..	1	..	..	..	✓	1	..	1	✓	..	1	..	..	..	1	..	..	✓	9
Tulane University School of Medicine	1	7	..	✓	..	1	2	✓	8	..	9	..	1	3	1	1	..	1	..	✓	✓	35
Johns Hopkins University School of Medicine	..	..	..	..	..	..	..	..	2	..	..	..	..	3	..	..	..	..	..	..	..	5
University of Maryland School of Medicine	..	4	..	..	..	..	..	3	4	..	✓	..	..	1	8	..	✓	..	..	..	..	20
Boston University School of Medicine	✓	9	..	4	✓	✓	1	✓	9	..	3	✓	5	5	..	..	..	..	..	..	..	36
Harvard Medical School	..	..	..	..	..	..	..	..	22	..	11	1	4	2	..	..	..	..	..	..	..	40
Tufts University School of Medicine	..	..	..	..	..	..	..	..	9	..	..	..	5	3	..	1	..	..	..	✓	1	19
University of Michigan Medical School	2	2	..	15	..	..	2	5	1	..	3	1	2	..	..	..	..	..	..	..	..	33
Wayne State University College of Medicine	1	4	..	1	1	✓	3*	2	10	..	2	1	✓	1*	..	..	..	..	..	..	..	26
University of Minnesota Medical School	7	2	..	16	9	1	5	9	21	4	17	4	10	8	..	✓	..	..	..	..	..	113
University of Mississippi School of Medicine	..	..	..	..	..	..	2	..	..	..	..	..	..	1	..	..	..	..	..	..	..	3
St. Louis University School of Medicine	3	9	..	..	..	..	..	2	5	..	1	..	..	..	..	..	..	..	..	..	..	20
University of Missouri School of Medicine	1	6	..	6	..	✓	3*	✓	1	..	1	..	✓	3*	✓	..	..	..	..	✓	✓	21
Washington University School of Medicine	1	..	..	..	1	..	..	1	3	..	4	✓	3	2	..	✓	..	..	13	..	1	29
Creighton University School of Medicine	1	2	..	✓	✓	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
University of Nebraska College of Medicine	1	2	..	✓	..	✓	3*	1	✓	..	✓	✓	✓	2*	..	✓	..	✓	✓	✓	✓	9
Dartmouth Medical School	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Seton Hall College of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Albany Medical College	..	2	..	..	..	..	1	..	2	..	3	..	..	..	..	..	..	..	..	..	..	8
University of Buffalo School of Medicine	✓	4	..	3	..	..	..	2	5	..	1	..	3	..	1	..	..	..	..	1	..	20
Columbia University	..	..	..	..	..	..	..	5	18	..	5	..	3	4	..	..	..	..	..	..	..	35
Cornell University Medical College	..	..	2	..	..	..	..	1	3	3	3	✓	2	..	..	..	..	..	..	..	..	14
Albert Einstein College of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	2
New York Medical College	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
New York University College of Medicine	1	4	..	1	✓	..	..	4	6	..	3	..	..	..	✓	6	..	3	..	..	..	28
State University of New York College of Medicine, N. Y.	✓	✓	..	..	..	..	..	2	2	..	..	..	2	3	..	..	..	..	..	..	..	9
State University of New York, College of Medicine, Syracuse	..	..	..	✓	..	..	✓	✓	✓	1	✓	..	3	✓	✓	..	..	..	..	..	..	4
University of Rochester School of Medicine	✓	2	24	4	..	..	1	1	11	13	6	..	✓	5	1	1	✓	1	3	..	1	74
Duke University School of Medicine	2	..	..	1	..	..	..	6	14	..	4	..	..	..	1	5	..	1	3	✓	1*	38
Bowman Gray School of Medicine	1	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3
University of North Carolina School of Medicine	..	5	..	6	..	..	1	..	3	..	4	..	..	3	..	..	..	..	..	..	..	22
University of North Dakota School of Medicine	2	2	..	2	..	..	✓	5*	..	4	..	..	✓	✓	..	..	..	..	..	..	..	15
University of Cincinnati College of Medicine	..	..	..	..	..	..	..	3	2	..	2	..	3	4	..	..	..	..	..	..	..	14
Western Reserve University School of Medicine	..	..	..	..	1	..	..	4	15	..	5	1	3	9	1	9	..	2	..	4	3	57
Ohio State University College of Medicine	12	12	..	..	8	..	13	8	3	..	✓	..	..	12	..	1	..	..	✓	✓	2	71
University of Oklahoma School of Medicine	..	2	..	6	1	1	1	4	6	..	5	3	4	2	..	..	..	..	..	..	..	35
University of Oregon Medical School	6	27	..	..	..	✓	13	4	..	1	..	..	..	..	..	..	..	..	..	..	..	51
Hahnemann Medical College	1	2	..	..	..	1	1	..	..	..	4	..	..	..	..	..	..	..	..	..	..	9
Jefferson Medical College	..	..	..	..	..	3	1	..	..	..	2	..	6	2	..	..	..	..	..	..	..	14
Temple University School of Medicine	2	2	..	2	5	2	3	✓	..	..	✓	3	✓	1	..	..	..	..	..	..	..	20
University of Pennsylvania	1	..	..	14	..	1	5	3	15	2	40	5	2	17	..	..	..	..	..	..	..	105
Woman's Medical College	..	..	..	..	..	..	..	✓	✓	..	✓	✓	✓	✓	..	..	..	..	..	..	..	..
University of Pittsburgh School of Medicine	..	6	..	..	..	..	..	..	3	..	..	..	..	..	..	4	..	..	..	..	..	13
Medical College of South Carolina	2	✓	..	✓	✓	2	1	✓	1	1	✓	✓	2	✓	✓	✓	..	✓	✓	✓	✓	9
University of South Dakota School of Medical Sciences	2	2	..	5	..	..	3	✓	..	..	..	..	..	..	..	..	..	..	..	..	..	12
University of Tennessee College of Medicine	..	6	..	3	4	2	4	1	6	..	1	2	4	8	..	..	..	..	..	..	..	41

TABLE 22.—*Advanced Degree Programs and Enrollment in the Basic Medical Sciences*—Continued

	MASTERS							DOCTORATES							POST-DOCTORATES							
	Anatomy	Biochemistry	Biophysics	Microbiology	Pathology	Pharmacology	Physiology	Anatomy	Biochemistry	Biophysics	Microbiology	Pathology	Pharmacology	Physiology	Anatomy	Biochemistry	Biophysics	Microbiology	Pathology	Pharmacology	Physiology	Total Enrollments
Meharry Medical College	..	✓	..	✓	..	..	✓	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Vanderbilt University School of Medicine	..	..	..	2	..	..	..	✓	..	6	✓	1	4	1	✓	..	..	..	..	..	1	15
University of Texas Southwestern Medical School	1	3	..	6	..	..	..	..	2	✓	1	..	..	..	..	..	..	..	..	..	..	13
University of Texas Medical Branch	6	..	..	3	..	1	2	2	2	..	..	..	2	6	..	..	..	..	..	..	..	24
Baylor University College of Medicine	5	7	..	5	..	..	2	4	4	..	3	..	..	1	..	..	..	..	..	..	..	31
University of Utah Medical Branch	3	5	..	4	..	✓	1	✓	4	8	✓	9	4	2	..	9	..	✓	..	2	..	51
University of Vermont College of Medicine	..	✓	..	2	1	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
University of Virginia School of Medicine	1	1	..	1	..	..	1	✓	✓	..	2	..	1	✓	..	..	..	..	..	..	..	7
Medical College of Virginia	2	2	..	✓	✓	..	1	1	✓	..	..	✓	6	2	..	..	..	..	..	..	..	14
University of Washington School of Medicine & Dentistry	..	1	..	13	..	2	3	3	18	..	10	✓	4	11	..	7	..	7	..	1	12	92
West Virginia University School of Medicine	..	5	..	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11
University of Wisconsin Medical School	3	✓	..	6	1	1	6	3	3	..	4	..	13	6	✓	6	..	1	4	✓	2	59
Marquette University School of Medicine	1	✓	..	3	7	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16
University of Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total Enrolled	107	269	28	225	62	67	163	159	419	52	240	36	163	235	35	66	0	22	31	12	26	2,417
Total Schools offering programs	49	58	4	53	24	35	53	55	60	13	55	23	52	56	17	22	2	17	11	16	19	
Total Schools Reporting Enrollment	42	52	4	45	18	26	48	41	55	12	44	13	45	51	10	14	0	12	5	6	10	

* Includes Pharmacology.

† Check (✓) indicates programs available in addition to those for which enrollments are shown.

Therefore, the table depicts less than the minimum number of other than medical students for whom the medical schools have teaching responsibilities. Whenever a school presents less than a complete picture of its total teaching and other responsibilities that require personnel, funds, and facilities, it is diminishing its own opportunities to secure complete understanding of its total needs by legislators, boards of trustees, and others who support the school.

The large number of students other than undergraduate medical students for whom medical schools have educational responsibilities in addition to those imposed by the medical students have significant implications on the personnel, budget, and facility needs of the schools. It is important that these needs take into account the total teaching, research, and service responsibilities of each school to avoid diluting the educational value of any of the programs. A further and more detailed presentation of this aspect was presented in the annual report two years ago.[20]

It should be noted that precautions have been taken in regard to table 21 to prevent duplication. As an example of this, even though the schools were requested not to include residents for the column depicting candidates for advanced degrees, the table includes only those in the basic sciences and fields unlikely to be reported also as residents.

ADVANCED DEGREE PROGRAMS AND ENROLLMENTS IN THE BASIC MEDICAL SCIENCES

The section of this report dealing with unfilled faculty positions again emphasizes the critical personnel needs for teaching posts in medical schools. The most assured pool for future faculty in the basic science disciplines is represented by students now taking advanced study in those disciplines. Table 22 presents the number of students enrolled and additional programs offered by basic science area and by degree level of study for the medical schools in the United States.

Similar information was published in last year's report. In 1955-1956 there were 1,119 students working toward the masters degree and 1,268 working toward the doctoral degree. In 1956-1957 there were 920 students at the masters level and 1,304 at the doctoral level. Although there is an over-all decrease, this is entirely at the masters level, since there has been a slight increase in the number of doctoral students.

During both years, most enrollments at both levels have been in biochemistry, with microbiology and physiology following in order.

The present report also includes a presentation of programs available and enrollments for post-doctoral students. It seems highly likely that there will be a demand and need for expanded educational facilities in medicine in the near future. It is anticipated that information regarding enrollments in advanced degree programs in the basic sciences will be presented in future reports so that all concerned may be kept aware of the pool of potential faculty.

ADVANCED DEGREE PROGRAMS IN THE CLINICAL SCIENCES

In recent years the Council office has received numerous inquiries as to which medical schools offered advanced degrees for graduate study in the clinical subjects. This information is given in table 23 as a response to these inquiries.

In addition to those included in table 23, advanced degree programs are also offered in ophthalmology (Iowa, Tulane, Michigan, Minnesota, Temple), urology (Creighton, Temple, Marquette, Tennessee), anesthesiology (Iowa, Minnesota, Temple), neurology (Georgetown, Michigan, Temple), orthopedic surgery (Northwestern, Temple, Tennessee), dermatology (Tufts, Wayne), physical medicine (Minnesota, Stanford), neurosurgery (Temple), nutrition (Iowa), otorhinology (Temple), and proctology (Temple).

TABLE 23.—*Advanced Degree Programs in Clinical Sciences*

	Surgery	Medicine	Public Health Preventive Medicine	Obst. Gynec.	Radiology	Pediatrics	Psychiatry
Coll. Med. Evangelists	x						
U-Calif., L. A.					x		
U-Colorado	x	x		x	x	x	x
Yale Univ.			x				
Georgetown Univ.	x						
Med. Coll. Ga.			x				
Northwestern Univ.	x	x		x			
U-Chicago	x						
U-Illinois	x	x		x			
State U-Iowa			x				
Tulane Univ.	x		x				
U-Maryland	x	x					
U-Michigan	x						
Wayne Univ.	x	x		x			
U-Minnesota	x	x	x	x	x	x	x*
St. Louis Univ.		x					
Creighton Univ.	x	x		x	x	x	x*
U-Nebraska		x			x	x	
State U-New York (N. Y.)							x
Cornell Univ.			x				
New York Med. Coll.	x						
U-Cincinnati			x				
Ohio State Univ.	x	x	x	x	x		x
U-Oklahoma			x				
Temple Univ.	x	x		x	x	x	x
U-Tennessee						x	
U-Texas			x				
U-Virginia	x						
U-Washington	x						
U-Wisconsin				x			
Marquette Univ.		x		x			
No. of schools	17	12	10	10	7	6	6

*Includes Neurology.

There are thirty-two medical schools which offer advanced degrees (usually at the masters level; some also at the doctoral level). Temple authorizes advanced degrees in 13 clinical areas; Minnesota in 10; Colorado, Iowa, Creighton, and Ohio State in 6 areas each. Such degree programs are most commonly found in surgery (17 schools), medicine (12 schools), public health and preventive medicine, and obstetrics and gynecology (10 schools in each area).

MEDICAL STUDENTS

ENROLLMENTS

For the eighth consecutive year, the number of students enrolled in approved medical schools in the United States has established a new record. Complete enrollment data for the individual schools are shown in table 3. Comparative data for this and preceding years are given in table 24. In order to present a true picture of medical education in the United States, table 3 and subsequent tables unless otherwise noted contain additions in the appropriate columns of the students in the newly developing schools, the University of Florida College of Medicine, Seton Hall College of Medicine and Dentistry, and Albert Einstein College of Medicine.

It should be noted that in this report, as was also the case for the two preceding years, the figures in table 3 for total enrollments by schools and the over-all total enrollment figure include the special and part-time students. The numbers of these students are tabulated for each school in the column after the total enrollment, although they are distributed in the enrollment figures in the prior columns of the table. There has been a 22% increase in the number of part-time and special students in the 1956-1957 school year compared with the previous year, though the total medical student enrollment has increased by on 1.3%.

The median total enrollment in 1956-1957 was 330, compared with 335 in the 1955-1956 year and with 338 in the 1954-1955 year. The average total enrollment was 366.5 this past year, compared with 370 in the previous year and with 375 in 1954-1955 year. There appears to be a trend toward smaller classes. This has been more than compensated by the entrance of students into the entirely new schools as well as into the newiy developed third-year and fourth-year programs of the University of Mississippi and of the University of Missouri medical schools.

TABLE 24.—*Schools, Students, and Graduates in the Medical and Basic Sciences Schools in the United States, 1931-1957*

Yr.	Schools	1st Yr.	2nd Yr.	3rd Yr.	4th Yr.	Total	Graduates
1930-1931	76	6,456	5,538	5,080	4,908	21,982	4,735
1931-1932	76	6,260	5,462	4,932	4,885	22,135	4,936
1932-1933	77	6,426	5,479	5,017	4,948	22,466	4,895
1933-1934	77	6,457	5,571	4,988	4,987	22,799	5,035
1934-1935	77	6,356	5,642	5,142	4,905	22,888	5,101
1935-1936	77	6,605	5,458	5,230	5,020	22,564	5,183
1936-1937	77	5,910	5,269	5,140	5,158	22,095	5,377
1937-1938	77	5,791	5,225	4,986	5,036	21,587	5,194
1938-1939	77	5,764	5,160	4,947	4,921	21,302	5,089
1939-1940	77	5,794	5,177	4,921	4,894	21,271	5,097
1940-1941	77	5,837	5,254	4,969	4,849	21,379	5,275
1941-1942	77	6,218	5,406	5,087	4,942	22,031	5,163
1942-1943	76	6,425	5,828	5,278	5,100	22,631	5,223
1943-1944	77	6,561	6,071	5,640	5,257	23,529	5,134
1944 (2nd Session)	77	6,648	6,140	6,084	5,794	24,666	5,169
1944-1945	77	6,523	5,979	5,700	5,826	24,028	5,136
1945-1946	77	6,060	5,750	5,751	5,655	23,216	5,826
1946-1947	77	6,564	5,575	5,767	5,994	23,900	6,389
1947-1948	77	6,487	5,758	5,154	5,340	22,739	5,543
1948-1949	78	6,688	6,194	5,702	5,086	23,670	5,094
1949-1950	79	7,042	6,344	6,079	5,638	25,103	5,553
1950-1951	79	7,177	6,690	6,263	6,056	26,186	6,135
1951-1952	79	7,436	6,864	6,577	6,195	27,076	6,080
1952-1953	79	7,425	7,063	6,725	6,475	27,688	6,608
1953-1954	80	7,449	7,068	6,983	6,727	28,227	6,861
1954-1955	81	7,576	7,104	6,957	6,946	28,583	6,977
1955-1956	82	7,686	7,174	6,883	6,886	28,639	6,845
1956-1957	82	7,791	7,204	7,023	6,834	28,852	6,796
Including data for schools developing new programs which have not yet been approved would increase the totals by the following figures							
1956-1957	85	8,014	7,259	7,023	6,834	29,130	6,796

Five schools had a total enrollment each of more than 600. The University of Tennessee led in this respect with a total enrollment of 787. The University of Michigan and the University of Tennessee medical schools admitted more than 200 students to their entering classes (202 and 225 respectively). There were again this year six additional schools with first-year enrollments of 150 or more students.

The entering class was the largest total ever enrolled (table 3). Of the increase of 272 in this total compared with last year, 54% is accounted for by the new schools, the University of Florida College of Medicine and Seton Hall College of Medicine. A major part of the remaining increase occurred because of substantial increases in the size of the first-year classes of the University of Illinois (up 14%), the University of Missouri (up 67%), and Albert Einstein College of Medicine (up 71%). The changes in the latter two schools were coincidental with their new programs and were anticipated. There was no substantial alteration in the class sizes of the other schools. The median first-year class for the four-year schools consisted of 84 students in 1956-1957, compared with 87 students in the previous year. The average first-year class in the four-year schools was 94 compared with 97 in the 1955-1956 year.

Table 25, prepared by Dr. Helen Gee for the Association of American Medical Colleges annual study of applicants,[21] lists by schools the number of applicants and applications to each of the schools for the 1956-1957 entering class. It should be noted

TABLE 25.—*Number of Applicants and Completed Applications by School for Class First Entering 1956-1957**

School	Size of Freshman Class	No. of Applications			Total Applications Filed by Applicants to Each School	Av. No. of Applications per Applicant
		Men	Women	Total		
Alabama	80	255	25	280	1,341	4.8
Albany	61	1,153	62	1,215	12,524	10.3
Arkansas	92	159	5	164	272	1.7
Baylor	81	841	36	877	6,286	7.1
Boston	72	1,085	73	1,158	11,574	10.0
Bowman Gray	52	597	33	630	5,009	8.0
Buffalo	80	791	36	827	8,588	10.4
California, L. A.	50	514	43	557	3,759	6.7
California, S. F.	76	490	43	533	3,555	6.7
Chicago Medical	71	1,032	26	1,058	10,887	10.3
Chicago, Univ. of	72	948	75	1,023	9,017	8.8
Cincinnati	83	1,054	31	1,085	8,586	7.9
Colorado	82	216	16	232	579	2.5
Columbia	118	1,447	165	1,612	13,828	8.6
Cornell	83	1,183	119	1,302	11,665	9.0
Creighton	76	652	23	675	5,136	7.6
Dartmouth	24	303	9	312	2,927	9.4
Duke	76	781	38	819	6,715	8.2
Einstein	96	1,024	69	1,093	11,250	10.3
Emory	72	614	32	646	4,369	6.8
Florida	47	381	18	399	2,047	5.1
Georgetown	111	913	39	952	8,812	9.3
George Washington	102	1,298	57	1,355	12,736	9.4
Georgia	95	247	19	266	583	2.2
Hahnemann	108	1,003	55	1,058	8,909	8.4
Harvard	115	1,257	113	1,370	10,560	7.7
Howard	76	407	44	451	2,333	5.2
Illinois	189	613	54	667	2,906	4.4
Indiana	157	435	17	452	1,898	4.2
Iowa	120	179	10	189	419	2.2
Jefferson	178	1,827	—	1,827	12,718	7.0
Johns Hopkins	77	871	79	950	8,513	9.0
Kansas	104	329	26	355	2,121	6.0
Louisiana	117	259	18	277	1,053	3.8
Louisville	100	269	16	285	982	3.4
Loyola (Stritch)	88	786	41	827	5,860	7.1
Marquette	102	976	37	1,013	7,190	7.1
Maryland	92	314	14	328	2,142	6.5
Medical Evangelists	97	186	16	202	472	2.3
Meharry	64	467	43	510	2,407	4.7
Miami	71	180	9	189	708	3.7
Michigan	200	630	46	676	3,147	4.7
Minnesota	128	287	13	300	1,273	4.2
Mississippi	76	175	7	182	346	1.9
Missouri	75	169	9	178	544	3.1
Nebraska	81	201	12	213	743	3.5
New York Medical	128	1,833	136	1,969	18,048	9.2
New York University	131	1,357	133	1,490	14,861	10.0
North Carolina	66	278	15	293	1,634	5.6
North Dakota	39	94	5	99	423	4.3
Northwestern	131	1,404	78	1,482	11,350	7.7
Ohio State	145	492	16	508	2,185	4.3
Oklahoma	99	257	18	275	1,045	3.8
Oregon	73	303	19	322	2,514	6.6
Pennsylvania	126	1,416	84	1,500	12,877	8.6
Pittsburgh	99	559	33	592	4,290	7.2
Puerto Rico	52	106	19	125	414	3.3
Rochester	70	1,008	76	1,174	11,904	10.1
Saint Louis	123	1,046	34	1,080	8,585	7.9
Seton Hall	80	817	65	882	7,136	8.1
South Carolina	80	157	5	162	302	1.9
South Dakota	39	214	10	224	1,712	7.6
Southern California	68	630	46	676	4,860	7.2
Southwestern	102	425	26	451	1,238	2.7
Stanford	62	482	29	511	3,795	7.4
State U. of N. Y. (N. Y.)	150	1,383	120	1,503	14,155	9.4
State U. of N. Y. (Syracuse)	78	1,021	66	1,087	10,740	9.9
Temple	133	1,479	73	1,552	12,078	7.8
Tennessee	199	517	28	545	1,421	2.6
Texas	156	468	29	497	1,280	2.6
Tufts	112	703	44	747	6,470	8.7
Tulane	129	886	50	936	6,917	7.4
Utah	54	270	2	272	1,821	6.7
Vanderbilt	50	757	36	793	7,257	9.2
Vermont	50	378	18	396	3,373	8.5
Virginia, Univ. of	76	682	30	712	6,025	8.5
Virginia, Med. Coll. of	83	314	21	335	2,085	6.2
Washington, Univ. of	75	444	17	461	2,706	5.9
Washington, St. Louis	86	1,265	51	1,316	10,562	8.0
Wayne	75	369	29	398	1,379	3.5
Western Reserve	84	1,198	74	1,272	10,379	8.2
West Virginia	31	117	5	122	423	3.5
Wisconsin	83	181	12	193	712	3.7
Woman's Medical	50	—	222	222	1,259	5.7
Yale	80	907	88	995	9,031	9.1
Total	7,824			59,798†		3.8

* Footnote 21.

† Total number of applications filed by all applicants to all medical schools.

that the totals of the applicants refer to applications and not to individual applicants. Although, as the table indicates, applications totalled 59,798, the number of individual applicants was 15,918. The Gee study total of 7,824 in table 25 for the 1956-1957 first-year class differs from the total of 8,014 given in table 3. The latter figure includes special and part-time students as well as those students repeating the first year, while table 25 includes only full-time students entering the first medical year for the first time. For a complete and detailed study of applicants, applications, and acceptances for this class, the Gee study should be consulted.

Enrollment data for approved Canadian medical schools are given in table 4. Comparison with similar data for last year reveals a diminution in total enrollment even though the four-year program of the University of Saskatchewan was in effect last year for the first time. The median total enrollment in 1956-1957 was 224 and the average was 304, compared with an average total enrollment in 1955-1956 of 327. A decrease of 23% in the total enrollment of Queen's University Faculty of Medicine more than counterbalanced the additional students in the University of Saskatchewan program. However, this decrease was more apparent than real. A readjustment in the curriculum in the 1956-1957 year provided for completion of the medical course in four years rather than five, with a second premedical year added to the over-all requirements. Therefore, the enrollments for Queen's University this year totaled four classes rather than five classes,

TABLE 26.—*Distribution of Students and Graduates in the United States and Canada by Sex, 1956-1957*

	Students		Graduates	
	Men	Women	Men	Women
United States				
Medical College of Alabama	277	22	69	2
University of Arkansas	323	18	74	3
College of Medical Evangelists	360	16	93	5
University of Southern California	255	11	66	2
Stanford University	217	15	52	5
University of California, Los Angeles	170	10	33	3
University of California, San Francisco	290	22	71	3
University of Colorado	299	23	68	2
Yale University	301	21	76	4
Georgetown University	402	22	102	12
George Washington University	353	19	83	5
Howard University	261	36	64	8
University of Miami	222	14	30	4
University of Florida	44	3	...	..
Emory University	278	8	72	2
Medical College of Georgia	356	20	73	5
Chicago Medical School	276	1	66	0
Northwestern University	496	24	122	4
Stritch School of Medicine	318	12	80	2
University of Chicago School of Medicine	265	22	65	4
University of Illinois	606	38	139	7
Indiana University	562	21	132	7
State University of Iowa	418	15	95	2
University of Kansas	398	17	102	5
University of Louisville	360	19	88	2
Louisiana State University	407	21	93	3
Tulane University	493	13	123	1
Johns Hopkins University	272	21	62	5
University of Maryland	351	12	80	5
Boston University	265	21	67	2
Harvard Medical School	484	31	140	5
Tufts University Medical School	416	25	108	5
University of Michigan	727	35	177	9
Wayne University	268	17	63	2
University of Minnesota	454	20	107	2
University of Mississippi	208	6	23	1
St. Louis University	469	12	112	0
University of Missouri	164	6	21	0
Washington University	335	12	89	4
Creighton University	278	9	66	3
University of Nebraska	309	9	77	0
Dartmouth Medical School	48	0	...	..
Seton Hall University	71	9	...	..
Albany Medical College	221	9	46	3
State University of New York, New York	545	42	143	2
University of Buffalo	288	12	62	3
Albert Einstein College of Medicine	144	7	...	..
Columbia University	427	45	101	13
Cornell University	314	21	80	6
New York Medical College	459	27	104	5
New York University	473	49	121	6
University of Rochester	268	11	60	5
State University of New York, Syracuse	273	15	61	2
University of North Carolina	244	8	56	2
Duke University	304	15	76	4
Bowman-Gray School of Medicine	194	15	49	6
University of North Dakota	75	5	...	..
University of Cincinnati	320	16	76	3
Western Reserve University	295	29	68	5
Ohio State University	552	15	129	4
University of Oklahoma	354	19	85	3
University of Oregon	278	15	63	2
Hahnemann Medical College	377	21	94	3
Jefferson Medical College	682	0	165	0
Temple University	465	26	111	3
University of Pennsylvania	483	20	119	7
Woman's Medical College of Philadelphia	...	182	...	40
University of Pittsburgh	349	13	88	3
Medical College of South Carolina	294	11	71	3
University of South Dakota	74	3	...	..
University of Tennessee	753	34	182	3
Meharry Medical College	239	19	52	1
Vanderbilt University	193	9	51	2
Southwestern Medical School	373	17	88	3
University of Texas	565	36	119	10
Baylor University	321	15	86	4
University of Utah	207	5	55	2
University of Vermont	168	11	39	1
University of Virginia	282	15	73	2
Medical College of Virginia	337	27	87	8
University of Washington	276	14	69	3
West Virginia University	54	4	...	..
University of Wisconsin	300	18	75	2
Marquette University	379	18	96	4
University of Puerto Rico	159	25	34	7
Totals	27,484	1,646	6,466	330
Canada				
University of Alberta	203	9	39	3
University of British Columbia	194	15	44	4
University of Manitoba	222	8	114	2
Dalhousie University	210	13	45	4
Queen's University	205	14	51	5
University of Ottawa	209	13	46	4
University of Western Ontario	213	13	50	4
University of Toronto	509	56	123	16
McGill University	401	24	90	7
University of Montreal	421	24	90	10
Laval University	509	29	110	3
University of Saskatchewan	123	18	27	2
Totals	3,419	236	829	64

as was the case last year and previously. Those students enrolled in the premedical years and in a required intern year in Canadian schools are not included in the total enrollment in table 4. There was a slightly smaller total first-year Canadian medical class in 1956-1957 than in the preceding year, with 6 of the 12 approved schools sharing in this diminution, though each of the smaller first-year classes diminished by less than 10%.

It is notable that 92 United States citizens were enrolled in the first medical year in Canadian schools as compared with 8 Canadian citizens enrolled in the first-year class of United States medical schools (table 27). More detailed information in regard to this can be found in the geographical section of this report.

ENROLLMENT OF WOMEN STUDENTS

Information by school on the number of men and women enrolled and graduated is shown in table 26. Dartmouth and Jefferson continued to limit their enrollments to men, and Woman's Medical College enrolled only women. The total number of women students showed an increase of 4.6% compared with last year, twice the increase shown last year as compared with the preceding year. Only 19 women students, or 1.1% of their total enrollment, is accounted for by the inclusion this year in the table of the three newly developing medical schools (Seton Hall, Albert Einstein, and University of Florida). The number of women graduates was again smaller than it was last year, the smallest in 10 years.

Excluding Woman's Medical College, the medical schools of three universities (Columbia, New York University, and State University of New York, New York City) each enrolled more than 40 women. Four other medical schools each enrolled 35 or more women (Howard University, University of Illinois, University of Michigan, and University of Texas). In four medical schools, women accounted for 10% or more of the total enrollment (Columbia University, Howard, New York University, University of Puerto Rico). Women represented more than 10% of the graduating class of five schools (Bowman, Gray, Columbia, Georgetown, University of Puerto Rico, and University of Miami).

The increasing absolute and proportionate enrollment each year for the past four years probably presages that the absolute decrease in women graduates will be arrested and may begin to increase in the near future.

GEOGRAPHICAL SOURCE OF ENTERING STUDENTS

Table 27 presents the residence of students at the time of their enrollment in the medical schools in the United States and Canada. The information is derived from enrollment data from the medical schools.

This table indicates that 40% of all first-year students in the United States schools came from six states (New York, Pennsylvania, Illinois, Ohio, California, and Texas), as was the case last year. The first-year enrollment of all the medical schools in these states represented 41% of the total enrollment for the nation. Almost 38% of all medical schools are located in the same states.

There were fewer than 20 first-year students in the medical schools in the United States from each of five states (Nevada, Delaware, Wyoming, New Hampshire, and Montana), and fewer than 25 students from each of five other states (Maine, Idaho, Rhode Island, Vermont, and New Mexico). Of these 10 states, only New Hampshire and Vermont have medical schools. Arizona had 22 medical students last year and 43 this year, on this list of states having the fewest students. The 72 students from the five states supplying the fewest medical students together with the 115 students from the five other states represented only 2.3% of the total first-year class, a proportion similar to that reported last year and similar to the proportions found for these states in the preceding two years. The 2.3% figure would have been identical (2.4%) with the proportion last year if, as was the case in that instance, students in the three newly developing schools were not included, as they have been this year.

Table 28 lists the states in ascending order according to the number of enrolled first-year medical students per 100,000 population. The six states with the largest number of first-year students are well scattered through this list, with half having the same as or less than the median number of students per 100,000 population (4.4) and half having more than the median number. With the exception of Vermont and Wyoming, the other eight states having the smallest number of first-year students enrolled in medical schools in all instances had fewer students than the median number.

The over-all ratio of students per 100,000 population, excluding members of the armed forces, appears to have increased from 4.56 to 4.76 in the past year. This apparent increase occurred entirely by including this year the first-year students in the three newly developing schools (Seton Hall, Albert Einstein, and the University of Florida). Including their entering students in tables depicting medical students as well as in discussion of these tables would seem to present a more realistic picture than could be presented otherwise. In the report for the 1955-1956 year, the first-year students in the newly developing Albert Einstein College of Medicine were not included in any tables which appeared at that time subsequent to table 1. Therefore the ratios for the two years do not have a comparable base.

There were 12 schools, all state-owned but one, that enrolled as first-year medical students only those resident in the state in which the school is located. This compares with 11 schools last year and 13 in the 1954-1955 year. When the list of schools for the 1956-1957 year having enrollment limited to home-state residents is compared with a similar

	SCHOOL	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Medical College of Alabama	77	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	University of Arkansas	..	..	100	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	College of Medical Evangelists	1	2	1	21	3	..	..	1	..	..	1	1	..	2	2	..	..	..
4	University of Southern California School of Medicine	..	2	..	59	..	..	..	..	..	..	1	1	..	..	..	..	1	..
5	Stanford University School of Medicine	..	2	..	44	..	..	..	..	..	..	..	2	2	..	..	..	..	..
6	University of California School of Medicine, Los Angeles	..	1	..	48	..	..	..	..	..	..	1	..	..	..	..	..	..	..
7	University of California School of Medicine, San Francisco	..	..	..	78	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	University of Colorado School of Medicine	..	5	..	..	63	..	..	..	..	..	..	..	..	..	..	..	..	..
9	Yale University School of Medicine	1	..	..	4	..	18	..	1	..	1	..	5	..	..	1	..	..	..
10	Georgetown University School of Medicine	..	..	..	..	..	4	..	10	..	..	..	..	..	..	..	..	1	..
11	George Washington University School of Medicine	1	1	..	9	..	5	1	18	..	..	2	3	..	1	..	..	..	..
12	Howard University College of Medicine	5	..	..	3	..	..	..	4	4	1	..	1	1	..	..	..	5	..
13	University of Florida College of Medicine*	..	..	..	..	..	..	..	..	44	..	..	..	..	..	..	..	..	..
14	University of Miami School of Medicine	..	..	..	..	..	..	..	..	71	..	..	..	..	..	..	..	..	..
15	Emory University School of Medicine	11	..	..	..	..	..	..	..	18	26	..	1	..	..	..	..	..	..
16	Medical College of Georgia	..	..	..	..	..	..	..	..	..	102	..	..	..	..	..	..	..	..
17	Chicago Medical School	..	..	..	..	..	..	..	..	..	..	..	12	1	..	..	..	..	..
18	Northwestern University Medical School	..	4	..	7	..	..	..	..	2	..	2	56	5	1	2	1	..	..
19	Stritch School of Medicine of Loyola University	..	..	..	4	..	1	..	..	..	..	..	44	4	1	..	..	1	..
20	University of Chicago, The School of Medicine	..	..	..	8	2	..	..	..	2	..	..	36	4	..	..	..	..	..
21	University of Illinois College of Medicine	..	..	..	..	..	..	..	..	..	..	..	190	..	..	..	..	..	..
22	Indiana University School of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	155	..	..	1	..	..
23	State University of Iowa College of Medicine	..	..	..	..	..	..	..	..	..	..	..	4	..	113	..	..	..	..
24	University of Kansas School of Medicine	..	1	..	4	..	1	..	..	..	..	..	..	..	..	85	..	..	..
25	University of Louisville School of Medicine	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	96	..	..
26	Louisiana State University School of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	125	..
27	Tulane University of Louisiana School of Medicine	11	4	4	3	..	..	..	..	9	2	..	1	..	..	2	1	16	..
28	Johns Hopkins University School of Medicine	2	1	..	5	..	..	1	1	1	5	..	2	2	..	..	..	1	..
29	University of Maryland School of Medicine	..	..	..	1	..	2	..	..	2	..	1	..	..	..	..	..	..	..
30	Boston University School of Medicine	..	..	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	1
31	Harvard Medical School	..	1	..	7	1	2	..	..	1	..	1	2	2	1	..	1	..	..
32	Tufts University School of Medicine	..	..	..	1	..	15	..	..	..	..	..	..	..	..	..	..	..	8
33	University of Michigan Medical School	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
34	Wayne State University College of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
35	University of Minnesota Medical School	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
36	University of Mississippi School of Medicine	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37	University of Missouri School of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
38	St. Louis University School of Medicine	1	1	1	17	..	3	..	..	4	..	1	17	1	1	5	..	1	..
39	Washington University School of Medicine	2	1	..	5	1	..	..	..	3	..	3	10	1	1	1	1	..	..
40	Creighton University School of Medicine	..	..	..	18	1	..	..	..	..	..	1	3	..	5	2	..	..	..
41	University of Nebraska College of Medicine	..	..	..	1	..	..	..	..	..	..	..	..	1	3	..	..	..	..
42	Dartmouth Medical School	..	1	..	1	3	..	..	..	..	..	..	2	2	..	..	..	..	1
43	Seton Hall College of Medicine and Dentistry*	..	..	..	..	..	3	..	1	..	..	..	1	..	..	..	..	..	..
44	Albany Medical College	..	..	..	1	..	7	..	..	..	..	..	..	..	..	..	..	..	..
45	University of Buffalo School of Medicine	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
46	Columbia University College of Physicians and Surgeons	1	2	..	3	..	5	..	1	2	..	..	1	1	..	..	..	..	1
47	Cornell University Medical College	1	2	..	5	1	6	..	1	..	..	..	2	..	..	..	1	..	2
48	Albert Einstein College of Medicine*	..	..	..	3	..	1	..	..	..	..	..	..	..	..	..	..	..	..
49	New York Medical College, Flower and Fifth Avenue Hospitals	..	..	..	..	..	6	..	..	..	1	..	..	..	..	..	..	..	1
50	New York University College of Medicine	..	..	..	..	..	3	..	..	1	..	..	..	..	..	..	2	..	..
51	State University of New York College of Medicine, New York City	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
52	State University of New York College of Medicine, Syracuse	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
53	University of Rochester School of Medicine and Dentistry	..	..	..	2	..	3	1	1	1	..	..	2	1	..	..	..	1	..
54	Duke University School of Medicine	..	..	..	1	..	..	..	4	9	1	..	2	..	..	..	1	..	1
55	Bowman Gray School of Medicine of Wake Forest College	..	..	..	..	..	..	..	1	5	3	..	..	..	..	..	2	..	..
56	University of North Carolina School of Medicine	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..
57	University of North Dakota School of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
58	University of Cincinnati College of Medicine	..	..	..	2	..	..	..	..	2	..	..	2	1	..	..	7	..	..
59	Western Reserve University School of Medicine	1	..	..	..	..	..	..	..	..	..	1	5	..	..	2	..	..	..
60	Ohio State University College of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
61	University of Oklahoma School of Medicine	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
62	University of Oregon Medical School	..	1	..	1	..	..	..	..	..	..	5	..	..	..	..	..	..	..
63	Hahnemann Medical College and Hospital of Philadelphia	..	..	..	1	..	1	3	..	..	..	..	..	..	..	..	..	..	..
64	Jefferson Medical College of Philadelphia	..	..	1	..	2	2	..	..	2	..	..	..	1	..	..	..	..	..
65	Temple University School of Medicine	..	..	..	..	..	..	2	..	1	..	1	..	..	..	..	..	..	..
66	University of Pennsylvania School of Medicine	..	..	1	3	..	2	3	1	2	..	..	1	..	..	..	1	..	1
67	Woman's Medical College of Pennsylvania	..	..	..	5	..	..	..	..	..	1	..	1	..	..	..	..	..	..
68	University of Pittsburgh School of Medicine	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..
69	Medical College of South Carolina	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
70	University of South Dakota School of Medical Sciences	..	..	..	2	2	..	..	..	..	..	..	4	..	4	..	..	..	..
71	University of Tennessee College of Medicine	2	2	2	..	1	..	..	..	7	3	..	..	..	..	..	5	..	..
72	Meharry Medical College	1	..	..	3	..	..	..	..	6	3	..	1	1	..	..	..	11	..
73	Vanderbilt University School of Medicine	6	..	1	..	..	..	..	..	3	..	..	1	..	..	..	7	..	..
74	University of Texas Southwestern Medical School	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
75	University of Texas Medical Branch	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
76	Baylor University College of Medicine	..	5	1	4	2	..	..	2	..	1	..	3	..	..	..	2	1	..
77	University of Utah School of Medicine	..	4	..	2	..	..	..	..	..	..	1	..	..	..	..	..	..	..
78	University of Vermont College of Medicine	..	..	..	..	..	11	..	..	..	..	..	..	..	..	..	..	..	5
79	University of Virginia Department of Medicine	..	..	..	..	..	..	2	1	1	1	..	1	..	..	..	..	..	..
80	Medical College of Virginia	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
81	University of Washington School of Medicine	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
82	West Virginia University School of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
83	University of Wisconsin Medical School	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
84	Marquette University School of Medicine	..	..	..	5	..	..	..	..	1	..	..	7	1	1	..	..	..	..
85	University of Puerto Rico School of Medicine	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Totals	125	43	112	396	82	107	13	49	205	153	23	428	190	135	102	131	164	21
86	University of Alberta Faculty of Medicine	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
87	University of British Columbia School of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
88	University of Manitoba Faculty of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
89	Dalhousie University Faculty of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
90	Queen's University Faculty of Medicine†	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
91	University of Ottawa Faculty of Medicine	..	..	..	..	..	2	..	..	..	..	..	3	..	..	..	..	..	..
92	University of Western Ontario Faculty of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
93	University of Toronto Faculty of Medicine†	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
94	McGill University Faculty of Medicine	..	..	..	5	..	5	..	..	..	..	..	1	..	..	..	1	..	2
95	University of Montreal Faculty of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
96	Laval University Faculty of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
97	University of Saskatchewan College of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Totals	..	..	..	5	..	8	..	..	..	..	..	4	..	..	..	1	..	6
	Grand Totals	125	43	112	401	82	115	13	49	205	153	23	432	190	135	102	132	164	27
	Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

* Newly developing medical school not yet eligible for full approval.
† Figures are for students in premedical year.

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	
Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	U.S. Territories and Possessions	Canada	Foreign	Home State	Out of State	Totals	Marginal Number
..	..	..	..	..	..	..	..	..	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	77	4	81	1
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	100	0	100	2
3	2	5	1	..	..	..	3	..	..	1	..	4	..	..	4	1	2	2	..	..	2	1	1	..	..	1	7	..	..	..	2	3	16	21	77	98	3
..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	59	9	68	4
..	1	..	1	..	..	1	..	..	..	..	..	..	..	..	1	..	3	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	1	44	18	62	5
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	48	2	50	6
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	78	0	78	7
..	..	..	..	..	..	..	..	..	..	..	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	63	21	84	8
..	8	1	1	..	1	1	..	2	..	2	..	21	..	..	..	..	..	5	1	..	..	..	..	1	..	..	..	..	1	..	1	..	3	18	62	80	9
5	13	..	..	..	..	..	..	..	..	24	..	36	..	..	4	..	..	9	2	..	..	..	..	..	..	2	..	..	..	..	1	..	3	10	104	114	10
11	2	2	2	..	2	..	..	..	..	6	..	9	1	..	1	..	2	8	..	..	..	..	..	2	..	2	1	5	2	..	1	..	2	18	84	102	11
..	..	2	1	3	..	..	..	..	..	2	..	10	2	..	3	2	..	3	..	2	..	1	5	..	..	2	..	2	..	..	1	..	13	4	74	78	12
..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	44	3	47	13
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	71	0	71	14
1	2	..	..	1	..	..	..	..	..	1	..	3	1	..	..	..	..	3	..	2	..	2	..	..	..	..	..	1	..	..	..	..	1	26	48	74	15
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	102	0	102	16
..	..	1	..	..	..	..	..	..	..	7	..	52	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	12	62	74	17
1	2	6	2	..	..	..	2	1	..	7	1	5	..	..	10	..	..	..	..	..	..	..	1	..	..	2	3	1	7	..	1	..	1	56	77	133	18
..	1	5	1	..	..	..	..	..	..	1	..	6	..	..	7	..	2	3	..	..	..	..	..	..	..	..	1	..	3	..	..	..	3	44	44	88	19
1	..	..	1	1	..	..	..	..	..	1	..	7	..	..	2	..	..	1	..	..	..	..	1	..	..	..	..	2	3	..	..	..	..	36	36	72	20
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	190	1	191	21
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	155	4	159	22
..	..	1	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	113	9	122	23
..	..	..	..	..	8	..	..	..	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	85	19	104	24
..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	96	8	104	25
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	125	0	125	26
..	2	..	1	27	4	1	..	..	..	1	1	1	..	..	2	5	..	4	1	..	..	2	18	..	..	..	..	..	..	1	4	..	6	16	118	134	27
17	3	1	1	..	..	..	1	..	..	7	..	9	1	..	2	..	1	7	..	..	..	..	1	..	..	2	2	1	..	1	..	..	..	17	61	78	28
71	2	..	..	..	..	..	..	..	..	2	..	2	..	..	1	..	..	2	..	..	..	..	..	2	1	..	1	2	..	..	1	..	..	71	22	93	29
1	42	1	..	..	..	..	..	..	1	4	..	11	..	1	1	..	..	1	5	..	..	..	..	..	..	..	..	..	..	..	1	..	..	42	34	76	30
..	24	3	..	..	3	..	..	..	3	..	6	29	1	..	10	..	1	5	1	..	..	2	1	..	..	3	1	..	1	..	..	1	1	24	91	115	31
..	66	..	..	..	..	..	..	1	2	4	..	9	..	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	1	..	..	66	46	112	32
..	1	182	..	..	1	..	..	..	..	..	..	3	..	..	6	..	1	3	..	..	..	1	..	1	..	..	..	..	..	..	2	..	..	182	20	202	33
..	..	77	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	77	0	77	34
..	..	..	117	..	..	2	1	..	..	..	..	..	..	1	..	..	..	1	..	..	2	..	1	..	..	..	..	..	1	1	..	..	2	117	13	130	35
..	..	..	..	74	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	74	2	76	36
..	..	..	..	..	75	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	75	0	75	37
..	2	1	2	..	21	2	1	..	..	2	..	10	..	..	15	1	..	1	..	..	2	..	3	1	..	..	1	..	..	..	1	..	4	21	102	123	38
1	2	..	..	..	16	2	..	..	..	1	..	12	..	..	1	2	..	..	..	..	..	..	10	2	1	..	1	1	2	..	2	1	..	16	70	86	39
..	..	..	1	..	3	1	15	..	..	1	1	7	..	3	..	..	1	..	..	..	2	..	..	..	..	..	6	..	..	1	3	..	1	15	61	76	40
..	..	..	..	..	..	1	79	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	79	8	87	41
..	2	1	..	..	..	..	..	..	2	3	..	4	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	2	22	24	42
..	1	1	..	..	..	..	..	..	..	41	..	25	..	..	..	..	..	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	41	39	80	43
..	5	..	..	..	..	..	..	..	..	4	..	45	..	..	2	..	..	2	1	..	..	..	..	..	..	..	..	..	..	..	1	..	1	45	23	68	44
..	1	..	..	..	..	..	..	..	..	6	..	70	..	..	1	..	..	1	1	..	..	..	..	..	..	..	..	..	1	..	2	..	..	70	14	84	45
..	6	1	1	..	1	2	..	..	1	14	..	55	1	..	3	2	..	5	..	..	2	..	1	..	1	..	1	1	..	1	..	4	55	65	120	46
1	1	1	..	..	2	..	..	..	1	8	..	36	..	..	..	1	..	5	..	..	..	..	1	..	..	..	1	..	1	2	..	2	36	48	84	47
..	..	..	..	..	..	..	..	..	..	5	..	81	..	..	3	..	..	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	81	15	96	48
1	12	..	..	..	..	..	..	..	..	26	..	71	1	..	2	..	..	4	1	..	..	..	1	..	..	..	..	1	..	..	..	..	..	71	57	128	49
1	5	..	..	..	..	..	..	..	..	7	..	111	..	..	1	..	..	1	..	..	..	..	..	..	..	..	1	1	1	1	..	..	..	111	25	136	50
..	1	..	..	..	..	..	..	..	..	5	..	146	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	146	9	155	51
..	..	..	..	..	..	..	..	..	..	2	..	76	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	76	3	79	52
1	2	2	..	..	..	..	..	..	1	4	..	40	..	..	3	..	..	1	..	..	..	..	..	..	..	..	..	1	1	1	1	..	..	40	31	71	53
1	1	..	..	..	..	..	..	..	..	6	..	3	23	..	1	1	..	2	..	8	..	4	..	..	..	6	..	2	..	..	1	..	..	23	55	78	54
1	..	..	2	..	..	..	..	..	..	..	..	3	39	..	1	..	..	..	..	..	..	1	..	..	..	2	..	3	..	..	..	..	..	30	24	54	55
..	..	..	..	..	..	..	..	..	..	..	..	1	63	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	63	4	67	56
..	..	..	1	..	..	..	..	..	..	..	..	..	..	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	37	4	41	57
..	..	1	..	..	..	..	..	..	..	1	..	2	..	..	74	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	74	20	94	58
..	2	4	1	1	1	..	..	..	..	2	..	7	..	..	56	..	..	5	..	..	..	..	..	..	..	..	..	..	1	..	1	..	1	56	35	91	59
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	150	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	150	0	150	60
..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	96	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	96	5	101	61
..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	58	..	..	..	..	..	..	..	..	..	5	..	..	..	3	..	..	58	18	76	62
1	1	1	..	..	..	..	..	..	..	26	..	3	..	..	..	..	..	68	1	..	..	..	..	..	..	..	1	1	..	..	..	..	..	68	40	108	63
..	1	1	..	..	..	..	..	..	..	14	..	8	2	..	5	..	..	135	..	..	..	..	..	..	..	..	..	4	..	..	1	1	..	135	45	180	64
..	..	..	..	..	..	..	..	..	..	21	..	4	..	..	..	..	..	98	..	..	1	..	..	1	..	..	1	..	..	..	4	..	3	98	39	137	65
4	1	1	..	..	2	..	..	..	..	9	..	5	2	1	2	..	..	76	2	..	..	1	1	..	..	..	..	..	2	..	..	..	2	76	50	126	66
..	3	2	1	..	..	..	..	..	..	10	..	12	..	..	2	..	..	12	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	12	38	50	67
..	1	1	..	..	..	..	..	..	..	1	..	7	..	..	7	..	..	79	..	80	..	..	..	..	..	..	..	2	..	..	..	..	..	79	21	100	68
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	25	..	..	..	..	..	1	..	1	..	..	..	1	25	16	41	70
..	..	..	12	3	..	..	..	..	..	..	..	..	5	..	..	3	..	..	1	..	174	3	..	..	..	2	..	..	..	..	..	..	..	174	51	225	71
2	..	1	..	5	..	..	..	..	..	1	..	1	8	..	2	..	..	3	..	4	..	6	8	..	..	4	..	1	..	..	..	..	2	6	68	74	72
2	..	1	..	1	2	..	..	..	..	1	..	1	1	..	..	1	..	1	..	..	..	24	..	..	..	..	..	..	..	..	..	..	1	24	30	54	73
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	106	..	..	..	..	..	..	..	..	..	..	106	0	106	74
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	164	..	..	..	..	..	..	..	..	..	..	164	0	164	75
..	2	..	..	..	3	1	..	..	..	..	2	1	1	..	3	8	..	1	..	..	1	1	33	..	..	1	..	..	1	..	..	..	2	33	49	82	76
..	..	..	1	..	..	..	..	2	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	42	..	..	..	..	..	..	..	..	..	42	12	54	77
..	3	..	..	..	..	..	..	..	7	2	..	2	..	..	..	..	..	..	..	..	..	..	..	..	19	..	..	..	..	..	..	..	1	19	31	50	78
1	2	..	..	..	..	..	..	..	..	1	..	7	..	..	1	..	..	..	..	..	..	..	..	..	..	54	..	3	1	..	..	..	..	54	22	76	79
..	1	..	..	..	..	..	..	..	..	2	..	2	4	..	..	..	..	..	..	..	..	1	..	..	..	66	..	6	..	..	..	..	1	66	18	84	80
..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	69	..	..	1	2	..	..	69	7	76	81
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31	..	..	..	..	..	31	0	31	82
..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	80	..	..	..	..	80	3	83	83
..	..	5	5	..	..	1	..	..	..	2	..	2	..	..	7	..	..	2	..	..	1	..	..	..	..	..	2	..	58	..	3	..	..	58	45	103	84
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	51	..	..	51	1	52	85
128	231	312	144	125	150	19	102	6	18	300	24	1,091	147	43	398	123	73	572	24	97	39	221	359	53	23	149	107	75	173	16	93	8	92	5,498	2,516	8,014	
..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	58	..	58	2	60	86
..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	54	5	54	6	60	87
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	61	7	61	7	68	88
..	1	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	47	6	47	14	61	89
..	1	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	52	..	52	4	56	90
..	1	..	..	..	..	..	..	..	..	2	..	4	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	48	7	48	20	68	91
..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	55	2	55	5	60	92
..	..	1	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	130	..	130	4	134	93
..	4	1	..	..	..	1	..	..	..	4	..	10	..	..	3	..	..	2	..	..	..	..	..	..	..	2	..	3	..	2	1	..	58	11	58	58	116	94
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	121	1	121	3	124	95
..	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	134	..	134	7	141	96
..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32	3	32	4	36	97
..	10	4	..	..	..	1	..	..	..	6	..	29	..	..	4	..	..	3	3	..	..	..	..	..	2	..	..	3	..	2	1	..	850	42	850	134	984	
128	241	316	144	125	150	20	102	6	18	306	24	1,120	147	43	402	123	73	575	27	97	39	221	359	53	25	149	110	75	175	17	93	858	134	6,348	2,650	8,998	
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	

list for last year, five changes in schools appear, two institutions having disappeared from the list, with three others added. Whether these represent changes in policies of geographical restrictions in enrollment, or are merely fortuitous, is not susceptible to positive answer on the basis of data submitted to this Council. An additional 18 schools, all publicly owned, have less than 10% of the entering class from outside the state. On the basis of statements from medical schools to the Association of American Medical Colleges regarding admission requirements,[13] 10 of the 12 schools having no out-of-state students in the 1956-1957 first-year class have absolute restrictions against such admissions. The other two have partial restrictions, giving first consideration and preference to applicants resident in the state in which the school is located. According to this source, of all 85 approved or developing schools in the United States, only 10 have absolute restriction of admission to applicants in the state in which the school is located, though 36 have partial restrictions. This may be in the form of giving first consideration and preference to applicants having home-state residence, or it may be a restriction of out-of-state enrollments to a fixed maximum proportion of the entering class, varying from 10 to 30%. Though five schools provide no specific statement regarding geographical restrictions on admissions, 34 schools have no such restrictions. All but one of these 34 schools are privately owned. However, three privately owned schools have partial geographical restrictions and one has an absolute restriction against admission of out-of-state residents.

Table 26 shows that 92 United States residents are enrolled in the first-year classes of Canadian medical schools, compared with 78 in the previous year, with 8 Canadians enrolled in the first-year classes of United States schools. The United States is thus the recipient of a favorable balance that represents an educational opportunity equivalent to another American medical school having as large an entering class as the present median of 84.

United States first-year medical students in Canada come from 17 states, with New York (29), Massachusetts (10), and Connecticut (8) accounting for 51% of such students. All but one of the Canadian schools have one or more United States students, with McGill University having 47 in the first medical year.

TABLE 28.—*Ratio of Freshman Students to State Populations, 1956-1957*

Numbers of Students per 100,000 population* in the Approved and Newly Developing Medical and Basic Science Schools of the United States	
Maine†	2.3
Nevada†	2.5
Rhode Island†	3.0
California	3.0
Montana†	3.0
New Mexico†	3.0
New Hampshire	3.2
Delaware†	3.3
North Carolina	3.4
Missouri	3.6
Idaho†	3.7
West Virginia	3.8
Alabama	4.0
Texas	4.1
Washington	4.1
Arizona	4.2
Georgia	4.2
Michigan	4.2
South Carolina	4.2
Indiana	4.3
Oregon	4.3
Virginia	4.3
Minnesota	4.4
Kentucky	4.4
Ohio	4.4
Illinois	4.6
Wisconsin	4.6
Connecticut	4.7
Maryland	4.7
Massachusetts	4.8
Kansas	4.9
Iowa	5.0
Pennsylvania	5.2
Wyoming†	5.2
Colorado	5.3
Louisiana	5.5
Florida	5.6
New Jersey	5.6
Oklahoma	5.6
District of Columbia	5.8
Mississippi	5.9
Arkansas	6.2
Vermont	6.2
Tennessee	6.4
North Dakota	6.6
Utah	6.6
New York	6.8
Nebraska	7.3
United States	4.7

* Estimated July 1, 1956, total population excluding members of the Armed Forces stationed in each area. Current Population Reports, Series P-25, No. 148, Nov. 18, 1956.
† States with no medical school.

TABLE 29.—*Comparative Analysis of College Records of First-year Medical Students, 1950-1957*

College Grade Average First-year Medical Students	1950-1951	1951-1952	1952-1953	1953-1954	1954-1955	1955-1956	1956-1957
3.6—4.0(A)	40	30	18.0	21.1	16.8	15.8	16.1
2.6—3.5(B)	43	55	67.5	68.9	69.0	70.6	69.9
1.0—2.5(C)	17	15	14.5	10.0	14.2	13.6	14.0

COLLEGE RECORD OF FIRST-YEAR MEDICAL CLASS

Table 29 presents a comparative analysis of the premedical collegiate scholastic record of the entering class in medicine each year since 1950-1951. There appears to be no significant change in the 1956-1957 year compared with the two preceding years. The most significant change in this three-year period compared with the 1950-1951 and succeeding year is in the proportion of students admitted to medical school with a "B" college grade average compared to those admitted with an "A" college grade average. For the past five years, more than two-thirds of the entering class have had "B" college grade averages, while only one-fifth to one-sixth of the entering medical classes have had an "A" college record.

Though medical school admissions committees recognize the differences among colleges in the relationship of a given grade average to scholastic achievement, this should be pointed out to others who might consult table 29. For instance, scholastic achievement in one college that is awarded a "B" grade might in another college be given a "C" grade, and, similarly, though to a lesser degree, in the case of "A" compared to "B" grades. It is probable that table 29 is of significance only as indicating an over-all trend.

has been indicated in the résumé referring to that Institute in the section on Matters of General Interest to Medical Education.

PREPROFESSIONAL REQUIREMENTS FOR AND ATTAINMENTS OF THE ENTERING CLASS

Comparing table 3 in this report with a similar table in the 1954-1955 education number of THE JOURNAL, there appears to be a marked shift by five medical schools toward requiring longer college preparation before admission to medical school, though two other schools (Pennsylvania and Vermont) have dropped their requirements from four to three years of college preparation. Though only one school stipulated a degree as an admission requirement in 1954-1955, seven medical schools so stipulate now (Einstein, Georgetown, Hahnemann, Johns Hopkins, Kansas, New York Medical College, Vanderbilt). However, inspection of table 30 reveals considerable discrepancy between re-

TABLE 30.—*Premedical Education of First-year Students in the United States, 1956-1957*

	No. of First Year	3 Yr. College Education	4 Yr. College Education	No. Holding Degrees	% with Degrees
Medical College of Alabama	81	17	64	64	79.0
University of Arkansas	100	35	65	54	54.0
College of Medical Evangelists	98	0	98	98	100.0
University of Southern California	68	13	55	44	64.7
Stanford University	62	20	42	41	66.1
University of California, Los Angeles	50	6	44	44	88.0
University of California, San Francisco	78	32	46	46	59.0
University of Colorado	84	34	50	40	47.6
Yale University	80	7	73	71	88.7
Georgetown University	114	6	108	108	94.7
George Washington University	102	40	62	62	60.8
Howard University	78	0	78	78	100.0
University of Miami	71	29	42	33	46.5
University of Florida	47	0	47	45	95.7
Emory University	74	19	55	55	74.3
Medical College of Georgia	102	17	85	79	77.5
Chicago Medical School	74	0	74	74	100.0
Northwestern University	133	41	92	92	69.2
Stritch School of Medicine	88	45	43	37	42.0
University of Chicago	72	12	60	50	69.4
University of Illinois	191	112	79	72	37.7
Indiana University	159	76	83	74	46.5
State University of Iowa	122	72	50	41	33.6
University of Kansas	104	1	103	101	97.1
University of Louisville	104	13	91	91	87.5
Louisiana State University	125	55	70	64	51.2
Tulane University	134	35	99	64	47.8
Johns Hopkins University	78	0	78	78	100.0
University of Maryland	93	22	71	70	75.3
Boston University	76	1	75	75	98.7
Harvard Medical School	115	3	112	110	95.7
Tufts College Medical School	112	4	108	108	96.4
University of Michigan	202	92	110	75	37.1
Wayne University	77	31	46	46	59.7
University of Minnesota	130	67	63	56	43.1
University of Mississippi	76	24	52	44	57.9
St. Louis University	123	19	104	89	72.4
University of Missouri	75	25	50	47	62.7
Washington University	86	11	75	70	81.4
Creighton University	76	39	37	37	48.7
University of Nebraska	87	37	50	46	52.9
Dartmouth Medical College	24	21	3	3	12.5
Seton Hall University	80	2	78	78	97.5
Albany Medical College	68	0	68	68	100.0
State University of New York, New York	155	8	147	145	93.5
State University of New York, Syracuse	79	10	69	69	87.3
University of Buffalo	84	7	77	70	83.3
Albert Einstein College of Medicine	96	1	95	95	99.0
Columbia University	120	0	120	120	100.0
Cornell University	84	4	80	80	95.2
New York Medical College	128	3	125	125	97.7
New York University	136	3	133	129	94.9
University of Rochester	71	4	67	66	85.9
University of North Carolina	67	22	45	44	65.7
Duke University	78*	16	61	54	69.2
Bowman-Gray School of Medicine	54	7	47	47	87.0
University of North Dakota	41	18	23	23	56.1
University of Cincinnati	94*	3	90	83	88.3
Western Reserve University	91	0	91	90	98.9
Ohio State University	150	20	130	130	86.7
University of Oklahoma	101	53	48	48	47.5
University of Oregon	76	23	53	46	60.5
Hahnemann, Philadelphia	108	3	105	105	97.2
Jefferson Medical College	180	3	177	175	97.2
Temple University	137	5	132	132	96.4
University of Pennsylvania	126	3	123	123	97.6
Woman's Medical	50	3	47	47	94.0
University of Pittsburgh	100	6	94	95	95.0
Medical College of South Carolina	80	12	68	64	80.0
University of South Dakota	41	14	27	26	63.4
University of Tennessee	225	99	126	64	28.4
Meharry Medical College	74	8	66	66	89.2
Vanderbilt University	54	21	33	33	61.1
Southwestern Medical School	106	38	68	60	56.6
University of Texas	164	34	130	118	72.0
Baylor University	82	9	73	71	86.6
University of Utah	54	34	20	15	27.8
University of Vermont	50	7	43	42	84.0
University of Virginia	76	7	69	69	90.8
Medical College of Virginia	84	18	66	64	76.2
University of Washington	76	25	51	51	67.1
West Virginia University	31	6	25	24	77.4
University of Wisconsin	83	58	25	25	30.1
Marquette University	103	43	60	52	50.5
University of Puerto Rico	52	7	45	42	80.8
Totals	8,014	1,800	6,212	5,849	73.0

* One student admitted with less than 3 yr. premedical education.

The Fourth Teaching Institute of the Association of American Medical Colleges in November, 1956, had as the subject Appraisal of Applicants to Medical Schools. The data presented then and the discussions by representatives of admissions committees made it abundantly clear that the college scholastic record is just one factor among many considered in the selection of medical students as

quirements stipulated by the medical schools and the actual attainments of the students. Of the seven medical schools requiring degrees, only one (Johns Hopkins) has 100% of entering students with degrees, though five of the degree-requiring schools have more than 95% of the entering class consisting

TABLE 31.—*Comparison of Admission Requirements, 1954-1955 with 1956-1957*

Stated Admission Requirement	No. of Schools 1954-1955	1956-1957
Less than 3 yr. college	1	1
3 yr. college	71	73
4 yr. college	8	4
Degree	1	7
	81	85

of students having degrees. An additional six schools have in their entering medical classes solely students with degrees.

Simply to provide useful comparisons between the current year and two years ago rather than to emphasize unduly the trend toward a longer college preparation required for admission to medical schools, tables 31 and 32 have been prepared. Table 31 shows the changes in the requirements stipulated by the medical schools. Table 32 indicates the increasing proportion of medical schools admitting as classes students predominantly holding degrees. It should be noted that the one school stipulating two years of college as a minimum requirement has reported taking no students with less than three years of college during at least the past three years.

As previously mentioned, two schools have lessened the number of years of college preparation required, while 73 medical schools state that they require three years of college before admission. However, one of these 73 schools has as an entering class entirely students with college degrees.

Statements regarding actual minimal preprofessional collegiate requirements for admission are presented in the brochure on "Admission Requirements of American Medical Colleges, 1957-1958"

TABLE 32.—*Comparison of 1954-1955 and Current Year of Proportions of Medical Schools Having Entering Classes Consisting Predominantly of Students with College Degrees*

	1954-1955 No. of Schools, %	1956-1957
	(81)	(85)
100% entering students have degrees	4.9	7.0
More than 95% entering students have degrees	13.5	16.4
More than 90% entering students have degrees	8.6	7.0
More than 85% entering students have degrees	6.2	11.7
	33.2	41.4

prepared by the Association of American Medical Colleges. The current trend toward lengthening this requirement, at the same time that the duration of graduate medical education is being increased, should be a source of concern and thoughtful study by medical educators as well as by the profession as a whole.

ATTRITION OF MEDICAL STUDENTS

For the third successive year, data have been obtained from the American medical schools on student attrition. It will be possible in the annual report next year, when data are available for the 1957-1958 academic year, to show losses for a single class followed through the four years that class is in medical school. In each succeeding year, an additional class can be so considered. It should be noted here that, although student attrition was considered in the 1953-1954 annual report, it was on the basis of data for the 1952-1953 academic year. Since the 1954-1955 report on attrition used data obtained for that year, the 1953-1954 data were omitted, making the present report only the third continuous year.

Table 33 depicts by class and cause the students lost to medicine during 1956-1957. Comparison of these figures with the previous year reveals relative constancy in the losses in each class and in the relation of the total losses to the total enrollments in the two years. It is encouraging to note that the proportion of students withdrawing in good

TABLE 33.—*Attrition in the Approved Medical Schools in the United States, 1956-1957*

Yr.	Enrollment	Failed	Withdrew, Poor Standing	Withdrew, Good Standing	Totals	% of Enrollment Lost
First	8,014	276	92	176	544	6.8
Second	7,259	110	14	70	194	2.7
Third	7,023	49	14	25	88	1.1
Fourth	6,834	11	5	14	30	0.3
Totals	29,130	446	125	285	856	

standing in the third and fourth years is lower this year than it was last year, indicating that previous higher ratios were either fortuitous or that the reasons for good students withdrawing are disappearing.

This year, as was also the case in the previous two years, about two-thirds of all losses were in the first-year class. The current data for 1956-1957 show that 67.6% of these losses were due to failure or withdrawal in poor academic standing. This is identical with the 67.6% for the first-year class in 1955-1956. The second-year class in 1956-1957 had 64% of their losses from this cause, compared to 62% for the 1955-1956 second-year class. In the current third-year and fourth-year classes, 67% of the student losses occurred because of failure or withdrawal in poor academic standing, compared with 55% for the third-year and fourth-year classes a year ago. It is hoped that the decrease in the proportion of students in good standing withdrawing in the third and fourth years that was first noted last year and is continuing this year is a significant trend. The proportions for such losses were 44.9% in 1955-1956 and 33.1% in the 1956-1957 year.

Table 34 shows for the past three years, by type of school ownership, data regarding enrollments, applications, and attrition due to unsatisfactory scholarship by the first-year classes. In the annual report for 1954-1955, a question was raised regarding a possible relationship between the higher attrition rate for poor scholarship in the publicly owned schools with their lower number of applications possibly on the basis of geographical restrictions. As table 34 indicates, there appeared in the following year to be no significant difference in the attrition rate between publicly owned and privately owned schools. The data for the current year again raise the question regarding such a relationship. As was noted in the section on the geographical source of entering students, and as table 27 illustrates in the figures for out-of-state students, it is chiefly publicly owned schools that exercise geographical limitations in admitting students into medical school. Application of the chi-square test to the deviations in the proportion of attrition by type of school ownership indicates that the opportunity of this occurring solely by chance was less than one in a thousand for 1954-1955 ($P<0.001$), was about one in five for 1955-1956 ($P>0.20$), and was about one in 25 in 1956-1957 ($P<0.05$ and >0.025). Though the level of significance varies considerably in the three years, it appears to justify careful thought and continued close observation. It is likely that the data in succeeding years will reveal whether or not there is a significant correlation between geographically restrictive admissions policies resulting in fewer applications and a higher incidence of attrition from unsatisfactory scholastic achievement.

TABLE 34.—*First-year Enrollments, Applications, and Attrition with Poor Scholarship by Type of School Ownership*

	1954-1955		1955-1956		1956-1957	
	Publicly Owned	Privately Owned	Publicly Owned	Privately Owned	Publicly Owned	Privately Owned
No. of schools	39	41	39	43	40*	45*
Percentage of enrollment	50	50	49	51	48	52
Percentage of enrollment from out of state	9	53	5	31	4	27
Percentage of failures and withdrawals in poor academic standing	70	30	56	44	60	40
Percentage of applications	26	74	19	81	27	73

* Includes the three newly developing schools not yet eligible for approval.

GRADUATES

As was anticipated last year, the graduates of medical schools in the United States were fewer this year. The graduating class has decreased slightly each year since 1954-1955 (table 24). Two schools had graduates for the first time in 1956-1957, the University of Mississippi and the University of Missouri, totaling 45. More than offsetting these gains were losses in the size of graduating classes of 40 schools, of which 8 each had at least 10 fewer graduates this year. A total of seven medical schools had 11 or more additional graduates in 1956-1957 compared with the previous year.

In 1957, three medical schools (Jefferson, Michigan, and Tennessee) each graduated more than 150 students, as compared with six such medical schools a year ago. Eight medical schools (Harvard, Illinois, New York University, Northwestern, Ohio State, Pennsylvania, State University of New York at New York City, and Texas at Galveston) each had graduating classes larger than 125, compared with five such schools in 1956. The 11 medical schools having graduating classes larger than 125, including the largest, had a total of 95 fewer graduates in 1957 than the same schools had in 1956. Of the 11 schools named above, only the University of Pennsylvania had a larger graduating class this year than last year. The smaller total number of graduates occurred because of a smaller third-year class in 1955-1956. The explanation is not available for the smaller size of that class as compared with the two preceding years and with the steady rise in sizes of entering classes. Possibly a slightly larger attrition occurred in the first year of that class (1953-1954), though that is the year for which national figures on attrition are not known.

Considering that the 1956-1957 third-year class is the largest to date, it is anticipated that the number of medical school graduates in 1958 will be larger than in either this year or last year. It is unlikely that it will exceed the 6,977 graduates in 1955 because that year still included as graduates the 50 students completing the intern year required by Stanford University. The greatly augmented second-year class size of the University of Mississippi will affect the 1959 graduating class, as will for the first time graduates of Albert Einstein. It is expected that the 1959 graduating class, rather than 1958 graduates, will set a new record high. This will probably be exceeded in 1960 in view of the present entering class size and the appearance then for the first time of graduates from two other newly developing four-year medical schools, the University of Florida and Seton Hall.

THE NEXT ENTERING CLASS

Based on estimates submitted from the medical schools regarding the size of the 1957-1958 entering class, it will total about the same as the 1956-1957 class. A total of 36 medical schools expected slightly smaller classes, 28 anticipated no change, and 16 looked forward to larger entering classes. Since no additional schools will be taking classes for the first time in 1957-1958, the over-all prospect is for no significant increase in the total entering class, and possibly a slight decrease.

Although, as table 35 indicates, applications totaled 59,798, the number of individual applicants for the 1956-1957 entering class was 15,918. Since this is a larger figure than that obtained a year ago,

it appears that the trend toward fewer applicants evidenced until last year definitely has been reversed, permitting medical schools to fill all available openings with qualified applicants.

STUDENT FEES

Fees for resident and nonresident students charged by each medical school are listed in table 3. During the 1956-1957 academic year, the average tuition fee in American schools for resident students was $720 and for nonresident students was $918. Comparable figures for last year were $684 and $857, and for the 1954-1955 year fees were $646 and $807 for resident students and nonresident students respectively.

INTERNATIONAL EXCHANGE OF STUDENTS

The June, 1957, annual issue of "Open Doors" [22] prepared by the Institute of International Education presents a valuable and detailed report on the international exchange of students, faculty members, and physicians. It is of general interest to note that during the academic year 1956-1957 there were 40,666 foreign students in the United States coming from 136 nations and political areas of the world. Of these, 31.8% were from the Far East, 22.4% from Latin America, 14.7% from Europe, 13.4% from North America, 12.9% from the Near and Middle East, and somewhat less than 5% from Africa and Oceania. There were also 1,153 foreign teachers and researchers who had received appointments to American faculties and 6,741 foreign physicians in American hospitals. During this same period, 1,492 faculty members from United States institutions were engaged in teaching or research projects abroad. Complete statistics for American students studying abroad were not available for 1956-1957, but the records for 1955-1956 indicated that 9,887 Americans studied abroad during that academic year. Of this group 2,056 (including 293 in Canada) were engaged in study of medicine.

TABLE 35.—*Number of Applicants to Medical Schools, 1948-1957**

Yr.	No. of Individual Applicants
1948-1949	34,242
1949-1950	24,434
1950-1951	22,279
1951-1952	19,920
1952-1953	16,763
1953-1954	14,678
1954-1955	14,538
1955-1956	14,937
1956-1957	15,918

* Gee, H. H.: Study of Applicants 1955-56, J. Med. Educ. 31:863 (Dec.) 1956. Current year from Dr. Helen Gee, Association of American Medical Colleges.

The largest number of foreign students were engaged in study of some phase of engineering (9,057); the next largest group in the humanities (8,524); the third largest group in social sciences (5,859); the fourth largest number in natural and physical sciences (5,372); with the fifth largest number in the field of medical science (3,854). About half of this latter group represented foreign students listed as undergraduate and the remainder as graduate or special students. Business administration (3,485), education (1,982), and agriculture (1,469) represented the next largest groups of foreign students areas of study in this country.

American students abroad were studying in the fields of agriculture, architecture, business administration, creative arts, education, engineering, humanities, language and literature, medicine (2,056), natural and physical science, social science, and theology. Of those Americans abroad studying medicine, 6 were in medical schools in the Far East, 10 in the Near and Middle East, 1,592 in Europe, 142 in Latin America, 121 in Mexico, 293 in Canada, 2 in Africa, and 11 in Oceania. The two European countries harboring the greatest number of American students in medicine were Switzerland (669) and Italy (319); with Netherlands (174), United Kingdom (120), and Belgium (104) following in order. Smaller numbers of American students, in the order listed, were studying in Germany, Spain, Ireland, Austria, France, Denmark, and Sweden.

FOREIGN STUDENTS STUDYING MEDICINE IN THE UNITED STATES

In 1956-1957 there were 100 foreign students including 8 Canadian citizens enrolled in the entering classes of United States medical schools. Eighty-three of these were in 28 privately owned schools and 17 were in publicly owned schools.

Further study of the data in last year's annual report (table 27) dealing with foreign citizens enrolled in United States schools makes it apparent that citizens of United States territories and possessions were reported by medical schools in the foreign category. As a result, the figures published in that table were in error. In 1955-1956, there were 102 foreign citizens (including 5 Canadians) enrolled in the entering class rather than the 130 reported. In the 1954-1955 entering class there were 98 (including 4 Canadians) rather than the 104 reported.

In terms of numbers of students involved, the greatest contribution by American medicine to the medical education of foreign physicians continues to be at the graduate level. The statistics in "Open Doors" [22] indicate that in 1956-1957, 6,741 physicians from 88 countries trained in American hospitals. Of these, 4,753 held residencies and 1,988 were training as interns. This represented an increase of 703 physicians over the 6,033 reported for the previous year. Over one-third of these physicians were from the Far East, with the largest group from the Philippines (1,332). The other leading nationality groups of foreign physicians in the United States and the number from each country were Canada (576), Mexico (556), Turkey (427), Germany (324), Greece (305), Korea (296), Japan (253),

Italy (242), India (203), Iran (183), Cuba (180), and China (153). Women physicians totaled 908 or 13.5% of the foreign interns and residents, with the Far East and the Philippines accounting for over one-half of them.

Foreign physicians had appointments on the staffs of hospitals in 44 states, the District of Columbia, Hawaii, and Puerto Rico with three-fourths of them located in 10 states (one-quarter in New York and one-half in the states of Ohio, Illinois, Massachusetts, Pennsylvania, New Jersey, Missouri, Maryland, Michigan, and Texas). The 10 hospitals with the largest number of foreign physicians include Bellevue Hospital Medical Center, New York City (114), Boston City Hospital (75), Jersey City Medical Center (75), Henry Ford Hospital, Detroit (66), Kings County Hospital Center, Brooklyn (56), Cleveland Clinic Hospital (51), Michael Reese Hospital, Chicago (49), Memorial Center, New York City (46), Baltimore City Hospital (44), and Goldwater Memorial Hospital, New York City (42).

AMERICAN STUDENTS STUDYING MEDICINE ABROAD

A survey by the Institute of International Education indicated that in 1954-1955 there were 1,386 United States citizens enrolled in medical schools outside the United States and Canada. This year's report [22] covering 1955-1956, indicates an increase from 1,386 to 1,863 such students. As noted previously, the vast majority of these are in medical schools in Europe, particularly those in Switzerland, Italy, Netherlands, the United Kingdom, and Belgium.

During the two academic years concerned the ratio of applicants to admissions in United States medical schools was approximately 2:1. In view of this low ratio, it appears likely that many and possibly most of the American students who are now studying medicine abroad were not considered qualified for such study in United States schools. If this is in fact the case, the large number involved and even more significantly the increase of almost 500 students in one year, should be a matter of serious concern.

Information available regarding United States medical licensure of American-born graduates of foreign medical schools indicates that the full impact of these large numbers of American citizens studying medicine abroad is not evident at the present time. Table 36 presents the numbers of initial United States licenses issued to such physicians. Although it appears superficially that there has been an increase in this year over last year, this is probably not the case. In previous years, this information was not available from Pennsylvania and New York. The medical examining boards in both states have collected such data for this year and though Pennsylvania issued no licenses to American-born graduates of foreign schools, New York issued 50. On the apparently reasonable assumption that, in the other years presented in table 36, New York issued a somewhat similar number of such licenses, the data for this year would point to a real decrease rather than an apparent increase.

The reports of the surveys of the Institute of International Education, however, would justify the belief that in the future there will be an increasing number of United States citizens returning from medical practice after a medical education acquired abroad.

THE EDUCATIONAL COUNCIL FOR FOREIGN MEDICAL GRADUATES

The problems centering about evaluation of the medical qualifications of the foreign-trained physician seeking further education or licensure in the United States were explored to some extent in the 1955-1956 report. At that time the program proposed by the Cooperating Committee for Foreign Medical Graduates was also presented. In May, 1956, the Educational Council for Foreign Medical Graduates was formed to implement the program. Difficulty in obtaining the necessary tentative declaration of tax exemption status resulted in unanticipated delay. This was recently resolved and the Educational Council has received $100,000 each from the W. K. Kellogg Foundation and the Rockefeller Foundation as initial support for its program. Dr. Dean F. Smiley, former Secretary of the Association of American Medical Colleges, has been appointed as director of this new organization. It is expected that recruitment of other staff personnel, acquisition of office space and equipment will be completed, and final detailed planning for putting the new program in operation will be accomplished within the next few months.

TABLE 36.—*Initial United States Licenses Issued to American Graduates of Foreign Medical Schools (Excluding Canada)*

Year(s)	No. of Licenses Issued	No. of Licensing States
1950-1954	99	20
1955	89	19
1956*	103	15

* Includes number of licenses issued by New York (50) and Pennsylvania (0) which were not available in other years.

POSTGRADUATE MEDICAL EDUCATION

As a part of the increasing activities of the Council on Medical Education and Hospitals regarding continuation medical education for physicians, a "Guide Regarding Objectives and Basic Principles of Postgraduate Medical Education Programs" was published this year following its approval by the House of Delegates of the American Medical Association. This guide was sent to all medical schools in the United States, to all hospitals having approved internships and/or residencies, and to the other institutions and organizations active in this field. Copies are available on request to the Council

office. Another activity is the collection of information about postgraduate courses for physicians, for the purposes of publishing an annual directory of such courses.[23]

Every effort has been made to distinguish postgraduate courses for physicians from such other activities as conventions, assemblies, and society meetings. The latter have not been included either in the current list or in the analysis of postgraduate courses during the past year in order that more basic data could emerge that would have greater usefulness than would publication and analysis of extremely disparate activities.

TABLE 37.—*Postgraduate Courses by Category and Type of Practice for Whom Designed*

Course	Total No. of Courses Given	Designed for GP's and Part-time Specialists	Designed for Full-time Specialists	Designed for Both
Continuous short course 4 days or less	275	169	51	64
Continuous short course 5 days or more	336	224	88	13
Intermittent short course 4 days or less	36	28	7	3
Intermittent short course 5 days or more	283	198	70	12
Medical traineeship	21	13	5	2
Circuit course	87	65	1	21
Home study and other	16	6	5	5
Totals	1,054*	703	227	120

* This is the total number of courses reported in time for IBM analysis. Later reports increased the total to 1,079.

The study of postgraduate courses for the entire calendar year Sept. 1, 1956, to Aug. 31, 1957, was attempted this year, recognizing that enrollment data would necessarily be incomplete for the final two months (July and August). Several other steps were taken in order to secure basically realistic data. Enrollment cards on the courses were sent out to the sponsors bi-monthly for the courses held or initiated in that period. Multiple requests were sent in an effort to accumulate as complete information as possible in the case of repeated courses. These cards provided separate spaces for intern and resident enrollments, as well as for the number of practicing physicians, in order that the reports would be more meaningful in terms of postgraduate medical education. Since interns and residents are generally considered as graduate students, rather than postgraduate, they were not included in the present study. In addition, information was requested on the geographical location of the enrolled physicians' homes. This latter information, which provided a large amount of unique data, will be the subject of a later report on postgraduate medical education service areas.

The totals and tabular information result from the IBM analysis of punched cards prepared by the Machine Records Division of the American Medical Association from the edited postgraduate course forms and enrollment data submitted by the sponsors of the courses. The information collected in the past year and analyzed in this report will serve as realistic basic data for future comparisons.

On the basis of information reported to the Council, there was a total of 1,079 postgraduate courses or course offerings. Total enrollment is available for 1,007 of these, for which there were 34,913 physician registrations. However, in the following data, the analysis is based on 1,054 courses (or course offerings) because only this information was received early enough to permit IBM card punching. Of these 1,054 courses, enrollment data were available for only 985.

At the outset it should be understood that physician enrollments cannot be equated with individual physicians because an unknown number of physicians may have enrolled in more than one course during the year. Apart from this caution regarding interpretation, the numbers do represent physicians in practice or in military service.

Table 37 shows the numbers of courses given and whether they were designed for physicians in general or part-time specialty practice, for full-time specialists, or for both. It is especially interesting, in view of repeated statements to the contrary, to note the predominance of courses reportedly designed for physicians in general practice and in part-time specialty practice. These make up two-thirds of the total. If the 120 courses designed for physicians in both types of practice are added to the 720 courses specifically designed for the general practitioner, then such courses comprise more than three-fourths of the total.

It is not possible to compare the present numbers of courses, for whom they are designed, or enrollments with the previous year because the 1955-1956 period was based on a 9-month year, while the current study covers a 12-month year. It is possible to compare proportions, as shown in table 38.

There has been a large increase in the past year in the proportion of postgraduate courses specifically planned for the physician in general and in part-time specialty practice at the expense of courses reportedly designed for both full-time specialists and for general practitioners. Taking into consideration the fact that the previous year's courses were analyzed for a 9-month period and those of the last year for a 12-month period, as well as other factors, the above table represents a genuinely significant change. This would appear to be a desirable trend from the standpoint of the medical

TABLE 38.—*Change in Reported Proportion of Postgraduate Courses Designed for Physicians in General Practice*

Courses During	Designed for GP's, %	Designed for Full-time Specialists, %	Designed for Both, %
Sept. 1, 1955-May 30, 1956	23.9	16.8	59.2
Sept. 1, 1956-Aug. 31, 1957	68.3	20.4	11.3

educators who have questioned whether a single educational program can most effectively serve the interests of the two groups of physicians.

Table 39 shows the enrollments in the various kinds of postgraduate courses by physicians in general and in full-time specialty practice. The numbers of courses on which the enrollments are based should be noted, as these numbers may be smaller than those in the preceding table due to incomplete reporting at the time the analysis was initiated. An interesting point illustrated by this table is that only 60% of the reported enrollments are by physicians in general or part-time specialty practice, although more than three-fourths of all courses were designed exclusively or in part for the general practitioner.

TABLE 39.—*Postgraduate Courses by Category and Enrollments*

Course	No. of Courses with Enrollment Data	Enrollments by Full-time General and Part-time Specialty Practitioners	Enrollments by Full-time Specialists	Total Enrollments
Continuous short course 4 days or less	260	6,445	4,381	12,862
Continuous short course 5 days or more	293	2,504	2,956	6,727
Intermittent short course 4 days or less	36	792	55	881
Intermittent short course 5 days or more	271	2,680	1,118	4,629
Medical traineeship	20	98	56	164
Circuit course	86	3,340	1,713	5,586
Home study and other	16	437	375	3,096
Totals	982*	16,305	10,654	33,945†

* Although eventually 1,007 courses provided enrollment data, only 982 gave this data early enough for IBM analysis.
† The total enrollment figure exceeds the sum of the other enrollment figures because some forms gave no breakdown of the totals reported.

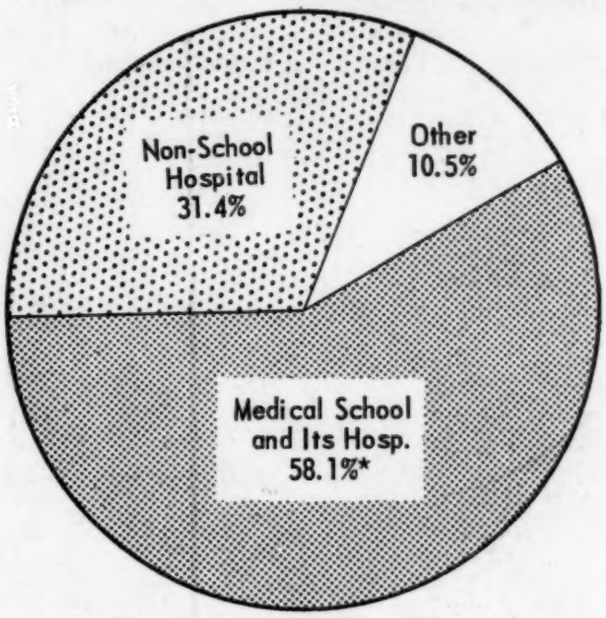
Although the enrollment by type of practice is 6,986 less than the total enrollment analyzed, the proportions of type of practice, hand-counted, for the 968 enrollments reported late did not vary from the above by more than 0.1%, suggesting that these are representative data.

TABLE 40.—*Ranking States Having Largest Enrollments in Postgraduate Courses Compared with Total United States Enrollment and Physician Population of States*

State	Physician Enrollment	% of Total U. S. Enrollment	% of State Physician Population
N. Y.	6,859	22.0	22.0
Calif.	6,660	19.8	31.9
Ill.	3,404	10.0	27.1
Minn.	2,153	6.3	48.3
Kan.	2,120	6.2	94.0
Ohio	1,313	3.8	12.0
Texas	1,244	3.6	14.2
Pa.	1,176	3.4	7.9
Total	24,929	75.1	

In addition to the total of 1,079 courses given (of which 1,054 were analyzed), 341 scheduled courses or course offerings were cancelled or were not given for lack of physician enrollments. Six institutions, of which three are in New York City, account for half (49%) of the cancelled courses. A total of 26 institutions or organizations each reported cancelling three or more courses last year. These included 12 medical schools, 3 university-affiliated postgraduate medical schools, 2 nonuniversity affiliated postgraduate medical schools, one medical society joint committee, 5 hospitals, 3 government institutions, and one foundation. The data submitted regarding the cancelled courses are being saved for future study in order to determine if possible whether there are any discernible factors common among them that discouraged physician enrollments.

The location of the courses by percentages of total hours is shown in the pie graph (see figure). The Council's guide suggests that medical schools and other hospitals provide the best facilities for postgraduate medical education. This appears to be the viewpoint also of many individuals in medical schools and hospitals, since 89.1% of all courses occur in these locations. However, as later tables show, some of the courses occurring in medical schools and in hospitals are primarily sponsored by other groups. This will be discussed in more detail in connection with the methods of education employed.



Courses by location. Percentages refer to total hours of postgraduate courses.

Table 40 gives the physician enrollments and comparisons with total enrollments and physician populations in the ranking states. It might be assumed at first glance that this table shows 94% of Kansas physicians enrolled in postgraduate courses in Kansas. A more likely interpretation is that these courses also attract physicians from other states having fewer educational opportunities. It is precisely because of the regional implications, es-

pecially in this phase of medical education, that a more detailed geographical study than has heretofore been made is planned during the coming year, utilizing data accumulated during the past year.

Although institutions and organizations in New York state offered almost three times as many courses as did California and had more than twice the number of institutions and organizations active in postgraduate medical education, California had nearly the same enrollment of physicians as did New York. This demonstrated interest in continuing education by the California medical profession appears to arise from an effective relationship between the California Medical Association and the five medical schools in the state, all of which are active in this field. The directors or assistant deans for postgraduate medical education of the five schools are a part of the California Medical Association Committee on Postgraduate Activities, along with other representatives of the profession as well as an able chairman and staff. The standing committee provides a common meeting ground and the opportunity for cooperative planning between the profession in the state and the medical schools. All of the postgraduate courses in California are staffed by medical school faculty personnel, whether the courses occur on or off campus. Continuing mechanisms for cooperative relationships between the state medical society and the medical schools as exemplified in California and in Kansas help to increase the interest of the medical profession in the postgraduate programs, provide a means through which the needs and wishes of the profession for their continuing education can be expressed, and thus aid in bringing into most effective use the resources of the region. To this point, the "Guide Regarding Objectives and Basic Principles of Postgraduate Medical Education Programs" states, "Thoughtful planning (of the postgraduate program) also means that the content of courses and other programs should be based upon the demonstrated needs and wishes of the physicians of the region, as well as upon advances in medicine. The means of ascertaining the needs and wishes of physicians will vary. Of great assistance is a close and cordial liaison among medical societies, medical schools, and hospitals of the region."

TABLE 41.—*Enrollment*

Course Category	Total No. of Such Courses Reported	No. Supplying Enrollment Data	Median Enrollment	Range Minimum-Maximum	No. Supplying Data on Hours	Median Hours	Range Maximum-Minimum
Continuous short course 4 days or less	275	260	31	1—462	254	15	2—32
Continuous short course 5 days or more	336	293	10	1—210	325	60	8—1000+
Intermittent short course 4 days or less	36	36	8	1—180	27	8	4—28
Intermittent short course 5 days or more	283	271	9	1—200	279	20	6—264
Medical traineeship	21	20	4	1—50	8	Data Insufficient	Data Insufficient
Circuit course	87	86	33	12—2433	76	30	5—100
Home study and other	16	16	Not Applicable	2—571	12	Not Applicable	Data Not Comparable
Totals	1,054*	982†			981		

* This is the total number of courses reported in time for IBM card punching. Later reports increased the number to 1,079.

† The number 982 represents the courses having enrollment data submitted in time for IBM analysis. Enrollments were eventually reported for 1,007 courses.

Table 41 represents an analysis of the median enrollments and the median hours for each category of postgraduate course. Medians rather than arithmetical means or averages were used as being more likely to show the central tendency without undue influence by extremes. The total ranges from minimum to maximum are also given to provide greater perspective for this information. Although many people think of postgraduate medical education as being usually en masse education, the size of the median course enrollments is notably small. The continuous short courses of four days or less (regardless of hours per day) and the circuit courses show median enrollments at least three times larger than those of the other categories. It should be mentioned that these two categories, although comprising only about one-third (34.4%) of all courses offered, had more than one-half (54.4%) of the total physician enrollments. However, the circuit courses offered a median of hours of instruction twice that of the continuous short course of four days or less.

The range in hours of instruction is exceptionally large in the category of continuous short courses of five days or more because it includes a few full-time courses of 9 months as well as a few continuous short courses of five days having only 1 3/5 hours a day scheduled. It might be desirable in the future to split this category into two. Elimination of the few extremes would not have altered the medians.

The other categories having large ranges from minimum to maximum hours were the circuit courses and the intermittent courses of five days or more. These categories, which are similar except for location of instruction, are used for courses having from one hour once a week for several weeks and for courses convening several hours a week for several months.

The reason for the small median enrollment in the medical traineeship type of course is that such enrollments are often restricted to a few physicians at a time. This is frequently a necessity to avoid diluting the educational value of the residency, since the traineeships are in conjunction with the residency educational program, using its ward rounds and conferences. It is encouraging to note that 21 such

educational opportunities were reported in the past year. It is believed this is an increase over previous years, although no positive numerical comparison can be made because no such category was used in the years previous to 1956-1957. This kind of course is one of the newest, and on a less formal basis one of the oldest, forms of postgraduate medical education. As the term is now used, a medical traineeship may be defined as an individually arranged residency-type educational experience in a hospital approved for residency training in that field. It differs from the residency in being of shorter duration than a year because it is not intended to qualify the trainee for the practice of a specialty or for specialty board certification. It also differs in providing usually neither housing nor stipend and often exacting a fee from the trainee, as well as by not always involving such direct patient responsibility as does a residency. Usually a minimum of several weeks and a maximum of several months is set by the department chief for this educational opportunity. It is likely that many more such programs are available to physicians than are reported to this Council, possibly because of the desire of the department chairmen concerned to make such arrangements only with physicians in the region, whom they may interview before making a commitment. For instance, the medical school which originated the term "medical traineeship" and which regularly makes such arrangements with individual physicians does not report these courses officially to this Council. In order that the Council may better discharge its obligation of serving as a national source of information on postgraduate medical education, it is hoped that such reluctance to list medical traineeships will disappear as more physicians recognize that the list of courses cannot guarantee acceptance of a physician into any specific course listed. More sponsors of courses in all of the categories are restricting enrollments in the courses to definite maximums in order that the primarily participative methods of education may be used.

The educational methods employed are of particular interest in this field, as was pointed out in the annual report last year. They were a source of particular concern to the *Ad Hoc* Advisory Committee on Postgraduate Medical Education, because it was felt by the committee that an improvement in the methods of education used would provide a major means of improving the quality of postgraduate programs. In fact, one of the eight basic principles is stated in the Guide as follows:

> The EDUCATIONAL METHODS should include more than a series of lectures or panel discussions in which the physicians are primarily passive recipients. Methods requiring active participation include live clinics and bedside rounds, seminars, open question periods, laboratory work, and study of patients under supervision.

In order to increase the value of the annual list of postgraduate courses in the past two years, information on the educational methods employed has been solicited and included for each course and printed in the list.

For purposes of analysis, the methods employed may with one exception be divided into two groups: participative and nonparticipative. The methods stipulated on the postgraduate course questionnaire that may be grouped as primarily participative are as follows: live clinic, ward round, seminar, laboratory work in which enrollee performs procedures, and study of patients. The methods stipulated on the questionnaire that may be grouped as primarily nonparticipative are as follows: lecture, panel, motion picture, television, slides and models, and observation of procedures and surgery by the enrollees. These are labeled "passive" in the tables

TABLE 42.—*Methods of Education in Postgraduate Courses*

Category	Total No. of Courses	No. with Data on Educational Methods	No. Using Solely Passive Methods*	% of Total in Category That Are Passive*	No. Using Solely Passive Methods*	% of Total Analyzed	Over-all % of Foregoing
Continuous short course 4 days or less	275	273	39	14.3	50	18.3	32.6
Continuous short course 5 days or more	336	334	24	7.2	12	3.6	10.8
Intermittent short course 4 days or less	36	35	6	17.1	4	11.5	28.6
Intermittent short course 5 days or more	283	282	72	25.5	24	8.5	34.0
Medical traineeship	21	19	0	0.0	0	0.0	0.0
Circuit course	87	87	7	8.0	44	50.6	58.6
Home study and others	16	14	1	Not Applicable	1	Not Applicable	Not Applicable
Totals	1,054	1,044	149	14.3	135	12.9	27.2

* The term passive course is a brief term to denote those courses employing as educational methods those in which the enrollees are primarily passive recipients i. e., lecture, panel, motion picture, television, slides and models, observation such as of surgery.

because a short term was needed. Whether or not a one-hour lecture is any more participative during that hour for having an open question period scheduled after the lecture is questionable, though the desirability of following any lecture with such a question period is obvious. Therefore, in table 42 in order to present the facts as clearly as possible, the number of courses using otherwise nonparticipative methods of education but having question periods is separated from those having solely nonparticipative methods without even question periods.

Of the 1,054 courses analyzed, 10 furnished no information on educational methods used. Of the 1,044 that did provide such information, 149, or 14.3%, used solely nonparticipative methods of education. If one adopted the position that a motion picture, panel, or lecture is in itself no more

participative for the enrollees, though it is followed by an open question period, an additional 135 or 12.9% of the courses would be added, bringing the over-all total of such courses to 284, or 27.2% of the whole. However, if total of 53,500 hours of instruction are considered, the courses using solely nonparticipative methods comprised 4,189, or 7.8% of the total hours. The courses using nonparticipative methods plus open question periods comprise 2,677 hours, or 5% of the total, making up together 12.8% of the total hours.

TABLE 43.—*Location of Courses and Educational Methods*

Location of Course	Total Courses in Location	Total Course Hours	No. of Courses Using Solely Passive Methods of Education	% of Courses Using Such Methods	% of Course Hours
Medical school and its hospitals	621	31,094	87	14.0	7.5
Auditorium not part of hospital	22	1,008	6	27.2	7.2
Other hospitals	254	16,808	32	12.2	8.5
Clinic	21	590	2	9.5	7.4
Hotel	40	587	12	30.0	15.3
Home	8	208	Not applicable	Not applicable	Not applicable
Other	88	3,205	9	10.2	5.6
Totals	1,054	53,500	149*		

* An additional 10 course forms lacked data regarding educational methods.

The intermittent short course of five days or more appears a notorious category for having the largest proportion of the courses utilizing solely nonparticipative methods of education, chiefly the lecture without even open question periods. However, an explanation for this may be that most of the lecture courses on psychoanalysis and its history fall in this category.

More than half of the circuit courses appear to use either solely passive methods of education or these plus open question periods. This appears to be true also of one-third of the continuous courses of four days or less, and more than one-fourth of the intermittent courses of four days or less. As would be expected by its nature, each medical traineeship employed participative methods. In fact, the medical traineeship is designed to be the most participative educational opportunity in the whole field of postgraduate medical education.

When methods of education are correlated with location of the courses, table 43 emerges. As might be expected, courses not utilizing hospital facilities are chiefly responsible for use of strictly nonparticipative methods of education. Although it is true that 14% of courses located at medical schools use solely nonparticipative methods of education (without regard for those considered as participative only by virtue of having open question periods), a factor that helps explain this emerges when the methods of education are correlated with course sponsorship rather than simply with location. In only 6.7% of the courses sponsored by medical schools are solely nonparticipative methods employed—93.3% of the courses sponsored by medical schools utilized laboratory work, patient clinics, bedside rounds, seminars, or performing of the procedure by physicians enrolled, along with lectures, panels, audiovisual aids, and the other modalities. Although 621 courses were given in the medical schools, only 371 were primarily sponsored and reported by the schools. Similarly, although 254 courses were given in nonschool hospitals, only 123 were primarily reported and sponsored by the hospitals. It appears that the nature of the sponsorship influences the methods of education employed, as may be noted in table 44.

There has been a distinct improvement in the past year regarding the educational methods reportedly used. A year ago, for the course year 1955-1956, medical schools reported using participative methods in only 59% of the courses. This has risen to 93.3% in 1956-1957. In the previous year, hospitals employed participative methods in 84.7% of the courses and this has risen to 90.3% in the past year. Both general and specialty medical societies used one or more of the participative methods in three-fourths of their courses in the past year compared with only 22% in the previous year. However, it is possible that greater rigidity was exercised this year in excluding from analysis the society meetings, conventions, and assemblies, which change in base alone could greatly alter the proportionate educational methods used by medical societies. If conventions and other society meetings were included, as might have occasionally happened in the previous year, the proportion of programs using solely nonparticipative methods would rise sharply because of the problems inherent in program planning for groups of several hundred to several thousand physicians.

TABLE 44.—*Sponsorship and Educational Methods*

Sponsor	No. of Sponsors	Total No. of Courses	No. of Hours	No. of Courses Using Solely Passive Methods of Education	% of Total Courses	% of Hours
Medical school	46	371	14,093	62	6.7	0.96
University graduate and postgraduate schools	6	131	5,718	32	24.4	13.3
Nonuniversity graduate and postgraduate schools	2	145	18,385	4	2.7	0.53
General medical society	11	75	1,453	17	22.3	18.0
Specialty medical societies	25	35	993	10	33.3	36.4
Academies of general practice	2	38	1,058	2	5.2	1.3
Hospitals	39	123	5,546	12	9.7	4.8
Government (military, USPHS)	13	46	2,829	0	0.0	0.0
Others (e. g., heart association)	24	90	3,425	10	11.5	5.7
Totals	168	1,054	53,500	149*	14.1	

* An additional 10 course forms lacked data regarding educational methods.

The Council on Medical Education and Hospitals, its staff, and the Advisory Committee on Postgraduate Medical Education are entirely aware of the fact that methodology and course quality cannot be completely equated, nor is that the intension in the foregoing discussion of educational methods. It is certainly possible for a gifted speaker to present a well organized and stimulating lecture that is likely to arouse active mental participation in the listener. It is possible for bedside rounds and seminars to be dull indeed, with relatively little educational value. There is little to be gained simply by going through the motions of using certain methods without consideration of other pertinent factors. In addition to interested well-motivated students, any effective educational program requires enthusiastic leadership, capable teachers, careful advance planning, and suitable facilities. However, if these are present, they are usually best employed by using dynamic methods of education that enlist the participation of the student, whether he is an undergraduate medical student or a physician in graduate or postgraduate medical education. The postgraduate course questionnaires used in the present analysis do not provide information regarding the leadership, the teachers, the kind of advance planning, or the motivation of the students. They do provide some information about facilities, the sponsors, methods of education, subject matter, hours, and enrollments. These are the subjects of the current analysis.

Table 44 also shows the number of institutions and organizations actively sponsoring postgraduate courses. There is relatively little change compared with the previous year in the total of 168 compared with 171 reported last year. Two more medical schools have joined the roll. This does not completely represent the interest of medical schools, which was reported more fully last year on the basis of specific inquiry of them.[24] Additional school faculties express a distinct sense of responsibility for postgraduate medical education without having the resources to carry through with an active postgraduate program. The table does not fairly represent the interest of the medical societies, particularly of the academies of general practice, in postgraduate medical education because they often co-sponsor programs with hospitals and with medical schools. To avoid duplication in this report in the case of such co-sponsorship, the course was attributed to the hospital or the medical school rather than to the medical society.

Two subjects on which only one postgraduate course each was scheduled last year and subjects about which several inquiries were received in the Council offices were tropical medicine and geriatrics. There was doubtless much offered regarding the special problems of the ageing in some of the courses listed under general practice, gynecology, internal medicine, malignant disease, neurology, psychiatry, physical medicine and rehabilitation, and other fields. However, it was not possible to distinguish which of the many courses listed for other subjects dealt in part with the geriatric aspects of the field. It would be helpful to potential enrollees in the future if courses having substantial focus on the geriatric aspects of a subject could be so designated in the title or in a footnote on the questionnaires submitted to this Council.

Based upon the premise that improvement in the quality of many postgraduate programs is an urgent need the achievement of which is likely to result in the regular involvement of more practicing physicians in continuation education, the studies of the Council in this phase of medical education will concentrate more upon qualitative efforts and suitable means for such evaluations. The improvements noted in this report in the past year over the previous year are heartening ones. The data presented provide a useful base for future comparisons during this stage of rapid and healthy evolution of postgraduate medical education. As Carl E. Anderson of the University of North Carolina said, "Knowledge does not keep any better than fish. It requires recharging through your creative effort."

EDUCATION VALUES OF THE GRANTS AND TRAINING AWARDS PROGRAMS OF THE UNITED STATES PUBLIC HEALTH SERVICE

Because of their rapid growth since 1945 and their contribution and impact on undergraduate medical education, graduate education and training, and on the research activities and potentials of medical schools, any current report on Medical Education in the United States would be incomplete without presentation of the Educational Values of the Grants and Training Awards Programs of the United States Public Health Service. The following information reviewing the current status of these programs was prepared and submitted by the Office of Research Information, National Institutes of Health, Public Health Service, United States Department of Health, Education, and Welfare.

The research grants, fellowships, and training awards of the United States Public Health Service aid in the development of new knowledge in the nation's research institutions concerned with the health, medical, and related sciences. The scope of these programs has increased greatly since World War II, intensifying the search for basic causes of disease and for more effective methods of diagnosis and treatment. The programs both foster activity in needed areas of investigation and help increase America's supply of scientific personnel.

The National Institutes of Health, Public Health Service research center at Bethesda, Md., spends more than two-thirds of its annual appropriations for support of nonfederal research projects and re-

search training. The importance of NIH to the nation's science structure and medical progress is reflected in the postwar appropriations made by Congress for research fellowships, training awards, and research grants (table 45).

A wide range of medical and biological investigations is conducted and supported by the seven institutes—the National Cancer Institute, National Heart Institute, National Institute of Allergy and Infectious Diseases, National Institute of Arthritis and Metabolic Diseases, National Institute of Dental Research, National Institute of Mental Health, and the National Institute of Neurological Diseases and Blindness. In addition to these institutes, five divisions of the Public Health Service share in the responsibility for research project and training awards. One of these, the Division of Research Grants, coordinates the grants and training programs of the institutes and administers awards programs not falling within the seven disease categories.

Nine national advisory councils, composed of nonfederal leaders in medical science and public affairs, review all grant applications within their respective program areas and recommend action to the surgeon general. They are assisted by study sections—panels of outstanding specialists, mostly nonfederal, who are selected by the Division of Research Grants. In addition to these specific functions, the councils and study sections, as well as various special committees, contribute over-all policy guidance in the research grant and training activities.

TABLE 45.—*National Institutes of Health Appropriations for Grants and Awards to Nonfederal Institutions, Agencies, and Individuals for Fiscal Years 1945, 1950, and 1955-1958*

Year	Research Fellowships	Training Awards	Research Grants
1945	$ 28,000	$ 29,000	$ 85,030
1950	1,448,057	6,415,060	13,065,514
1955	2,562,000	11,051,000	33,918,000
1956	2,800,000	14,502,000	38,038,000
1957	5,397,000	28,075,000	80,697,000
1958	6,812,000	32,560,000	99,345,000

Below are brief descriptions of the Public Health Service programs that offer educational values. (Further information may be obtained from the Division of Research Grants, National Institutes of Health, Bethesda 14, Md.)

RESEARCH FELLOWSHIPS

Six classes of research fellowships are available from the National Institutes of Health to qualified United States citizens (or persons who have filed a Declaration of Intent). Predoctoral, postdoctoral, and special research fellowships are awarded to individual applicants. Senior research fellowships and student part-time research fellowships are available through schools of medicine, dentistry, nursing, and public health. Postsophomore research fellowships are available through schools of medicine and dentistry. Applications are processed by the Division of Research Grants, and the awards are made on a competitive basis upon recommendation by scientific committees.

The predoctoral research fellowship enables students with a bachelor's degree, master's degree, or equivalent training to pursue graduate research in the health sciences. Predoctoral fellowships are awarded for one year with assurance of support to the degree status if work continues to be satisfactory. Annual stipends for the first, second, and third years are $1,600, $1,800, and $2,000 respectively. The fellowship provides tuition, allowances of $350 for dependents, and certain travel expenses.

The postdoctoral research fellowship is awarded to candidates having an M.D., Ph.D., D.D.S., or equivalent degree. It carries a stipend of $3,800 for the first year, $4,200 for the intermediate year, and $4,600 for the third year. Dependency allowances are the same as for the predoctoral research fellowship.

Special research fellowships are awarded to qualified applicants with unusual competence in research or specialized research training. The stipend for each fellowship is determined at the time of award.

Senior research fellowships encourage highly competent scientists to conduct research in the preclinical sciences—anatomy, physiology, biochemistry, microbiology, pharmacology, pathology, biophysics, genetics, and the behavioral sciences. This program provides support between the completion of postdoctoral training and the time of eligibility for appointment to higher academic posts. Applicants must be sponsored by a basic science department of an accredited medical school, dental school, or school of public health. The fellowship provides a salary determined by the sponsoring institution. Partial research expenses up to $2,000 a year are also financed. Fellows are free to modify their research approach, to obtain additional support from the Public Health Service or other sources to conduct a portion of their research in other institutions, and to assume teaching responsibilities conducive to their academic development.

Student part-time research fellowships are designed to permit students to explore the field of research. Medical schools may request up to eight part-time fellowships in units of $600 each. Dental schools may request up to six units; schools of nursing and of public health, up to four. Each unit provides for part-time research during the school term or for full-time research during two months of any period when curriculum work is not scheduled for the student.

A new type of award, the postsophomore research fellowship, was instituted in 1957. It enables medical and dental schools to help students interested in research careers to obtain essential training in

the basic sciences. Participants drop out of regular course work during the training period. They receive full tuition, dependency allowances, and a stipend set by the school not to exceed $3,200.

VISITING SCIENTIST PROGRAM

The visiting scientist program is a flexible arrangement for inviting outstanding American and foreign scientists to utilize the extensive laboratory and clinical research resources of the National Institutes of Health. Two classes of appointment are available—"visiting scientists" and "research associate in the visiting scientist program." Participants must have a doctoral degree or the equivalent background, at least six years of postgraduate experience, and exceptional ability in a specific research problem. The salary range is from $5,400 to $12,600 a year. The purpose of the program is to increase the utility of the National Institutes of Health as a national resource and to strengthen interrelations with the broader scientific community.

TRAINING GRANTS

The training grants program of NIH is intended to augment the nation's supply of qualified scientific investigators by assisting in the establishment, expansion, and improvement of training and instructional programs in professional institutions. Training grants are made to schools of medicine, dentistry, nursing, and public health. Direct aid to the institution is provided by grants in two general classes—undergraduate and graduate.

Undergraduate training grants are awarded by the National Cancer Institute, National Heart Institute, and National Institute of Mental Health. The specific purpose of this program is to establish, continue, expand, or improve instruction relating to the prevention, diagnosis, and treatment of cancer, mental illness, and cardiovascular disease or related gerontological conditions.

Graduate training grants are awarded by all seven of the institutes. The objective is to assist professional schools in establishing and maintaining graduate instructional and training programs of high caliber, as well as to make funds available for the payment of trainee stipends.

Mental health career investigator grants, awarded by the National Institute of Mental Health, provide psychiatrists and scientists in related disciplines with an opportunity to acquire three to five years of full-time research training in mental health. The applicant institution, which may be a psychiatric research institution or a department of psychiatry in a medical school, pays the trainee a stipend ranging from $6,000 to $10,000 a year.

Two additional training grant programs were recently established by the National Institute of Health—an experimental program for training undergraduate medical students in research methodology and a program of graduate training grants in epidemiology and biometry. Both programs are administered by the Division of Research Grants. The experimental training program offers special grants to universities seeking to improve methods for training medical students for research careers. The funds paid to applicant schools include salaries of professional and nonprofessional personnel and stipends for individuals in training.

TRAINEESHIPS

Traineeship awards are intended to increase the number of investigators by encouraging advanced training in specialized areas of medical research. Examples of interest are the neurological diseases, ophthalmology and sensory diseases, diagnosis and treatment of cancer, and arthritis, diabetes, and the other metabolic diseases.

Regular or special traineeships are awarded directly to American citizens having a doctoral degree in health fields, including related biological and behavioral sciences. Traineeships are available through the National Cancer Institute, the National Institute of Arthritis and Metabolic Diseases, and the National Institute of Neurological Diseases and Blindness. The National Health Institute and the National Institute of Mental Health provide traineeships under training grants awarded to institutions for this purpose.

The regular traineeship carries a first-year stipend of $3,800, a second-year of $4,200, and a third-year of $4,600, plus dependency allowances of $350 and certain travel allowances. No allowances are made for tuition or supplies.

Special traineeships are awarded in varying amounts to qualified individuals who possess unusual competence for training or who require specialized training for a specific problem. The trainee may study at the institution of his choice. The stipend is determined by the particular training needs of the applicant. The National Institute of Neurological Diseases and Blindness awards special traineeships only to those who have completed residency requirements in a specialty.

Recent amendments to the Public Health Service Act provide traineeships for professional health personnel, supplementing the training activities of state and local governments. The program is administered by the Division of General Health Services, Bureau of State Services. Its primary purpose is to bring new people into the field of public health—physicians, dentists, nurses, and other professional health workers who have completed their basic education. Preference is given to applicants under 35 who have had no more than two years' experience in public health work and have had less than a year of graduate or specialized training in public health. Consisting of stipends, tuition, and certain allowances, the awards are paid directly to participants, with the exception of those made avail-

able through schools of nursing and of public health. Stipends range from $2,400 to $4,800, according to the applicant's academic degree.

Another amendment to the Public Health Service Act provides traineeships to prepare nurses for teaching, supervision, and administration in all fields of nursing including public health. Stipends of $2,400 to $3,600 plus tuition, certain travel fees, and dependency allowances of $360 are available through schools of nursing. This program is administered by the Division of Nursing Resources, Bureau of Medical Services.

RESEARCH GRANTS

Research grants support medical research on all major health problems and in basic sciences related to medicine. Each institute makes grants for research within its area of interest, and the Division of Research Grants supports studies outside the scope of the seven institutes. The program is intended to increase research in medical, dental, and other professional schools and institutions and to stimulate investigations in scientific areas needing exploration. A sizable portion of the grants is devoted to basic research. The program aids indirectly in training junior personnel employed in the research projects.

The research grants constitute by far the largest program of public Health Service awards, both in terms of money expended and the number of institutions affected. Appropriations supported approximately 6,000 such grants in 1957.

Field investigation grants, awarded by the National Cancer Institute, support developmental research, community studies, and surveys that will contribute to the prevention, control, diagnosis, and treatment of cancer in the general population.

The National Institutes of Health cooperate with the two service bureaus of the Public Health Service in administering grants for special research projects. Among these are investigations of the health aspects of air and water pollution, projects for the development and utilization of hospital facilities and resources, and studies to improve nursing education and service. The projects are administered by the Division of Research Grants for the sponsoring divisions in the Bureau of State Services (the Division of Sanitary Engineering Services and the Division of General Health Services) and in the Bureau of Medical Services (the Division of Hospital and Medical Facilities and the Division of Nursing Resources).

HEALTH RESEARCH FACILITIES

In 1956 Congress approved a three-year program of construction grants to accelerate the building and equipping of urgently needed new laboratories and other health research facilities. Thirty million dollars was appropriated and granted in fiscal year 1957; another 30 million dollars has been appropriated for 1958; and present authorization includes 30 million dollars for one additional year. Applications submitted by nonfederal public and private institutions to the Division of Research Grants are evaluated by the National Advisory Council on Health Research Facilities, which in turn recommends action to the surgeon general. The construction projects are financed on a matching basis.

CONFERENCES AND SEMINARS

To encourage early and adequate exchange of information among investigators, numerous conferences, seminars, and symposiums are supported in connection with the grants and training programs. Many of the meetings are initiated and sponsored by the advisory study sections of the Division of Research Grants.

A conference held in May, 1957, sought expert information on methods of insulin assay which will help two of the division's study sections—Metabolism and Nutrition and Endocrinology—to evaluate applications for research grants. Under the auspices of the Division's Pathology Study Section, a special committee is directing attention to needs for research in pathology. The Biophysics and Biophysical Chemistry Study Section sponsored regional conferences in 1956 and 1957 to help determine how best to provide training and develop research in the theory and practice of medical-science instrumentation.

Meetings such as those supported by the National Institute of Mental Health provide orientation and training in specific services (the annual conferences, for example, on the reporting of mental hospital statistics) as well as opportunities for review and development of standards for various professions. The National Institutes of Health also provide personnel and exhibits for medical and scientific meetings of state, regional, national, and international scope.

In addition, the institutes, separately or as a whole, present lectures, seminars, and clinical conferences in which there is active participation by faculty members of universities and medical schools, by staffs of other research centers and Public Health Service hospitals, and by physicians in private practice and other leaders in the medical sciences.

NATIONAL DEFENSE AND MEDICAL EDUCATION

SELECTIVE SERVICE SYSTEM

The following information has been obtained from the Selective Service System National Headquarters, current to July 1, 1957.

The responsibility for primary classification of registrants rests with Selective Service local boards. If a person or his employer (college, medical school, or hospital) has requested his deferment and he has been classified as available for military service, the person or his employer may, within 10 days of the

mailing of the notice of classification, file an appeal. The appeal will be reviewed ordinarily by the appeal board having jurisdiction where the registrant's local board is located, but it may be transferred for review to the appeal board having jurisdiction in the area where the registrant is working or attending college if this is requested in writing when the appeal is made. If the state appeal board should sustain the classification, the registrant or his employer may, if there is a dissenting vote in the appeal board, file a written request with the local board to have the decision appealed to the president of the National Selective Service Appeal Board. If there is no dissenting vote, the state or national director of Selective Service may appeal the case to the President.

The "college student certificate," SSS Form 109, continues to be prescribed for the use of institutions of higher learning, including those of medicine, in furnishing the local boards information regarding registrants who are enrolled as students in those institutions. These forms should be submitted to the local boards by the educational institution on request of the registrant. However, the mere filing of such a form does not constitute a request for occupational deferment, since, in order to establish the right of appeal as an interested party, a written request from the college or employer for occupational deferment must accompany the form. The registrant has the right of appeal if exercised in the prescribed 10 days. He may make his appeal informally in writing.

ELIGIBILITY FOR CONSIDERATION FOR DEFERMENT

The law empowers the President to provide for the deferment of any person whose deferment is equitable and in the national interest. Furthermore, it is the sense of Congress that provision should be made for the annual deferment from training and service of premedical, predental, and allied preprofessional students in numbers equal to those at present (1950) in attendance at colleges and universities as outlined in the general student deferment program. The President is also directed to establish a national advisory committee to advise the Selective Service System and to assist state and local advisory boards in selecting the needed medical, dental, and allied personnel. This provision expired on July 1, 1957, but it has been reentered in a bill which, at the time of preparation of this material, has passed the House but has not yet passed the Senate.

Sections 1622:15 and 1622:25 of the Selective Service Regulations specify the conditions under which students pursuing programs of higher education may be considered for deferment. Within these specified requirements, students of the healing arts are considered for deferment in the same manner as students pursuing other undergraduate or graduate courses at colleges, universities, and similar schools.

Any student not previously deferred who is pursuing a full-time course of study is entitled to a single period of statutory deferment, Class 1-S, until the end of the academic year. Such deferment does not preclude the possibility of later deferment in Class 2-S. Students whose activity in study, research, medical, or other endeavors is found necessary to maintenance of the national health, safety, or interest may be deferred in Class 2-S until completion of their college training, provided they maintain satisfactory scholastic records. A student who is deferred for study extends his liability for military training and service up to his 35th birthday instead of his 26th, as prescribed for registrants who have never enjoyed a deferment.

In selecting a student for deferment in Class 2-S, the Selective Service local boards may, at their discretion, be guided either by the score made by the student on the Selective Service College Qualification Test or by his record of academic performance. The college qualification test is given for the Selective Service System by the Science Research Associates, Inc., of Chicago. At present, in order to be eligible for deferment on the basis of this test, an undergraduate student must make a score of 70 or more. SSS Form 108 has been prescribed for furnishing to the local board the score made on this test. This score is confidential and may be divulged by the local board only to the registrant or to one holding his written consent.

To qualify for deferment on the basis of academic performance, the nonprofessional student must have maintained the following standing among the male members of his class: freshman year, upper one-half; sophomore year, upper two-thirds; and junior year, upper three-fourths. A student accepted for admission to medical school after July 1, 1951, for the class next commencing may be deferred, provided that, during his last full-time year at college or university, he was ranked among the upper one-half of the male members of his class or had a score of 70 or more on the Selective Service College Qualification Test.

A student accepted for admission by a graduate school after July 1, 1951, as a full-time student for the class next commencing may be deferred provided that, in his last full-time academic year in a college or university, he achieved a scholarship standing among the upper one-fourth of the male members of his class or scored 80 or more on the qualification test and provided that the graduate school certifies that he is meeting the degree requirements. Decisions concerning deferment of American students enrolled in foreign universities, including medical students, are the responsibility

of the local boards. The local board may accept or reject any claims or evidence presented for deferment.

Status of Interns and Residents

The Selective Service System has always recommended the deferment of graduates of medicine to complete one year of internship training. Selective Service has stated that men, to be given favorable consideration for deferment to complete a residency or more than one year of internship, should be absolutely essential to the operation or maintenance of the hospitals where they are employed or that they be among those selected by the Assistant Secretary of Defense (Health and Medical) "or the Surgeon General of the United States Public Health Service," and recommended for specialty training necessary in the staffing of the hospitals of the armed forces. The Selective Service System is of the opinion that there is a sufficient number of young physicians who have satisfied their military liability or who are physically disqualified for military service to satisfy the requirements of the hospitals for residents and to provide for specialty training for civilian needs.

The Selective Service has agreed to recommend to the Selective Service local boards the deferment of men in a number not to exceed 3,000 as an overall total for the Assistant Secretary of Defense and the surgeon general of the United States Public Health Service. It is expected that this program will be continued from year to year after the expiration of the special provisions of the Universal Military Training and Service Act.

All young physicians participating in this program are to be commissioned in the reserve component of one of the armed services or the Public Health Service, and they are to be selected by the Assistant Secretary of Defense (Health and Medical) or the surgeon general of the Public Health Service for such training. The request for deferment is to pass from the individual to the Assistant Secretary of Defense (Health and Medical) or the surgeon general of the Public Health Service and then, if recommended, will be forwarded through national headquarters of the Selective Service System to the respective local boards of that system.

A young physician who has established himself in a community where he has been found by his local board essential to the maintenance of an adequate medical service in that community may be deferred by his Selective Service local board or such a physician may be deferred for teaching, research, or Public Health work when these are considered by the local board to be in the national interest. For the academic year 1957-1958, the Public Health Service has arranged certain research grants for students who have completed two years in medicine. These grants will be for one year and the deferment of these special men will be requested by the individual registrant and recommended by the surgeon general, United States Public Health Service.

Status of Faculty Members

No policy has been announced by the Selective Service System on the granting of deferment to faculty members, except that teachers of medicine have been mentioned in a Selective Service Operations Bulletin as being in a critical occupation to which local boards should give special consideration. It has been recommended that as a general policy, essential members of the medical, dental, and veterinary faculties be held in their teaching positions until such time as replacements are found. This recommendation applies especially to persons in the basic science departments. This policy is not a blanket recommendation for deferment from military service for all teachers. Part-time teachers, who devote only a small portion of their time to teaching, will be expected to enter the military services.

Expiration of the "Doctor-Draft" Law

The August, 1957, issue (vol. 7, no. 8) of Selective Service *carried a statement regarding the expiration of the "Doctor-Draft" law and the new legislative provisions for "Specialists' Service." Because of its importance from the standpoint of medical education as well as its implication in medical practice, this statement is presented in full in the following paragraphs.*

"Doctor-Draft" Law Expires; New Legislation Provides for Specialists' Service

Amendments to the Universal Military Training and Service Act, as amended, adopted in June, 1957, replace the former "Doctor-Draft" law and provide for meeting the requirements of the Armed Forces for medical, dental, and allied specialists until June 1, 1959. Under the new amendments only those specialists who are otherwise liable as regular registrants are subject to induction under the Selective Service Law.

The old "Doctor-Draft" law under which medical, dental and allied specialists had been liable since 1950 expired July 1, 1957. It had placed liability for service on older doctors, dentists, and allied specialists, at one time up to the age of 51.

One of the principal effects of the new amendments to the basic Selective Service Law is to limit liability of doctors, dentists and allied specialists to age 35 for those deferred on or after June 19, 1951; and to age 26 for others. Public Law 85-62, which amends the basic Selective Service Law with respect to these specialists, was signed by the President on June 27, 1957. By placing medical, dental and allied specialists under the same provisions of law and regulations as other registrants with respect to the upper limit of the age of liability, the 1957 amendments relieve from liability under the Universal

Military Training and Service Act, as amended, any such specialist over the age of 32 on the date the amendments became effective—July 1, 1957. This is true because in order to have acquired extended liability under the June 19, 1951 amendments, a registrant must not only have been deferred on or after that date, but also must not have attained the 26th anniversary of his birth by that date. Any man who was 26 on June 19, 1951, would, on July 1, 1957, have been 32 years old.

The amendments in addition provide that

(1) No person in the medical, dental, and allied specialist categories shall be inducted if he applies for an appointment as a Reserve officer and is or has been rejected for such an appointment on the sole ground of physical disqualification.

(2) The President may order to active duty for not more than 24 consecutive months any member of a Reserve component who is such a specialist, who is under 35, and who has not performed at least one year of active duty in the Armed Forces.

(3) Any such person called or ordered to active duty from a Reserve component of the Armed Forces and who serves on active duty as a specialist for twelve months or more, shall upon release from active duty or within six months after release, be given an opportunity to resign the commission unless he is otherwise obligated to serve in active training and service in the Armed Forces or in training in a Reserve component by law or contract.

(4) Any physician or dentist qualified for a Reserve commission shall, so long as need for his services exists, be given an opportunity to volunteer for active duty of not less than 24 months.

(5) The President may prescribe rules and regulations for the selection or induction of persons by age group or groups and for the selection and induction of persons qualified in needed medical, dental, or allied specialist categories pursuant to requisitions submitted by the Secretary of Defense.

(6) Qualified specialist aliens liable for induction shall not be held ineligible for appointment as commissioned officers solely on the grounds that such alien specialists are not citizens or have not declared their intention of becoming citizens.

(7) Any qualified person who is liable for induction, or who is ordered to active duty as a member of a Reserve component as a physician, or a dentist, or in an allied specialist category, shall be appointed, reappointed, or promoted to such grade or rank as may be commensurate with his professional education, experience, or ability provided that any person in a needed medical, dental, or allied specialist category who fails to qualify for, or who does not accept, a commission, or whose commission has been terminated, may be used in his professional capacity in an enlisted grade.

(8) Periods of active duty performed by such specialists in student programs prior to receipt of appropriate professional degree or in intern training shall not be counted toward establishing the qualification of such specialists for classification as a veteran exempt from liability for training and service.

(9) It is the sense of Congress that the President provide for deferment of optometry students and premedical, preosteopathic, preveterinary, preoptometry and predental students in numbers at least equal to the numbers of such male students now studying in colleges and universities.

(10) Public Law 62, 85th Congress, amending the Universal Military Training and Service Act, as amended, to provide service liability for persons in medical, dental and allied specialist categories, expires on July 1, 1959.

With the expiration of the requirement for special registration of medical, dental, and allied specialists, such specialists under the amendments of June 27, 1957, should notify their local boards within 10 days of the attainment of degrees in these fields.

MEDICAL EDUCATION FOR NATIONAL DEFENSE

The following information on the current status of Medical Education for National Defense has been obtained from the national coordinator of the program.

The Medical Education for National Defense (MEND) Program is presently active in 35 of the American colleges of medicine, and 10 additional schools have been selected to begin their affiliation on Jan. 1, 1958. Requests for MEND participation have been considerably in excess of the program's ability to expand, and a waiting list for affiliation is maintained. The 35 schools presently taking part in the program are Baylor, Buffalo, California (San Francisco), University of California at Los Angeles, Colorado, Cornell, Creighton, Duke, Emory, Georgetown, Illinois, Kansas, Louisiana State, Louisville, Maryland, College of Medical Evangelists, Michigan, Mississippi, New York University, North Carolina, Ohio State, Pennsylvania, Pittsburgh, Stritch, Temple, Texas,—Medical Branch (Galeston), Tufts, Tulane, Vanderbilt, Vermont, Medical College of Virginia, Washington (Seattle), Washington University (St. Louis), Western Reserve, and Wisconsin. The 10 schools which will join the program at the beginning of 1958 are Albert Einstein, Bowman Gray, Columbia, Howard, Iowa, Miami, Northwestern, Oklahoma, Rochester, and Virginia.

MEND is a function of the MEND Program Subcommittee of the Association of American Medical Colleges; it is endorsed by its parent organization, by the American Medical Association's Council on Medical Education and Hospitals and the Council on National Defense, and by medical officials of the Department of Defense, Army, Navy, Air Force, Public Health Service, and Federal Civil Defense Administration. It has received the approval and cooperation of a wide variety of federal and private medical and educational activities.

The purpose of the program is to encourage the teaching of principles of military and disaster medicine by regular faculty members of our medical colleges. Nothing is mandatory; each faculty is free to accept or reject any part of the program not consistent with the local philosophy of medical education. All emphasis is on medical rather than military topics. It is hoped that the problem of national preparedness in medical education can be solved by interested faculty members on a local basis and under local control rather than through such methods as the establishment of a federal medical school or through direct federal intervention in curricular content.

Annually, MEND sponsors a series of symposiums, with the programs having been presented at federal medical installations by personnel in government service. During 1956-1957, the program included symposiums on (1) Aviation Medicine, Wright-Patterson Air Force Base, attendance 32; (2) Submarine and Diving Medicine, Experimental Diving Unit, Washington, D. C., attendance 35; and (3) Social and Preventive Psychiatry, Walter Reed Army Institute of Research, Washington, D. C., attendance 51. Each year MEND also conducts an Orientation Tour for Deans and Coordinators of MEND-affiliated schools, designed to introduce them to current problems and trends in the federal services. The tour of the past year included visits to Army, Navy, and Air Force facilities and concluded with a field trial of the FCDA 200-bed Emergency Hospital.

Activities at the 35 colleges have included special lectures, conferences, and demonstrations in the following subjects: surgery of trauma, wound ballistics, war wounds, radiobiology, defense measures to chemical and biological warfare, aviation medicine, management of mass casualties, civil defense responsibility of the medical profession, infectious disease problems in disaster situations, and others.

The national coordinator of MEND has an office at the Bureau of Medicine and Surgery, Department of the Navy, Potomac Annex, Washington 25, D. C.

Army, Navy, and Air Force Procurement Program

The following information summarizing the Army, Navy, and Air Force procurement programs has been submitted by the office of the Assistant Secretary of Defense (Health and Medical), current to June 18, 1957. It has been prepared so as to give the reader a general picture of current procurement programs in the medical branches of the armed services insofar as they concern undergraduate and graduate medical education.

ARMY

Early Commissioning Program for Medical Students

Medical students may apply for commissions in the grade of second lieutenant, Medical Service Corps, U. S. Army Reserve, for inactive duty without pay and allowances while attending medical schools. Students participating in this program will be obligated to accept superseding appointments in the grade of first lieutenant, Medical Corps, U. S. Army Reserve, upon graduation and to serve on active duty for a period of two years upon completion of internship. Persons appointed under this program will be assigned to Ready Reserve units in appropriate Medical Corps vacancies in TOE and TD troop program units, USAR Schools, and USAR Control Groups (Annual Training).

Participation in the program will not in itself increase the active service liability or obligation of the participant. However, participants will be required to certify to their understanding that appointment prior to attaining age 26 incurs an obligation for active participation in the Reserve training unless excused under regulations to be prescribed by the Secretary of the Army. Those individuals assigned to units who fail to graduate will be relieved from such assignment. Failure to graduate from medical school, resulting in subsequent Selective Service reclassification as 1-A, may result in induction as an enlisted man under current policy.

Clinical Clerkship Training Program

Participants in the Clinical Clerkship Training Program will be medical students at the sophomore-junior and/or junior-senior level, who now hold appointments in the Medical Service Corps, U. S. Army Reserve, as lieutenants, or will be commissioned in sufficient time to participate in the program. A limited number may also participate in the program as "student employees" under Civil Service. Students in Army Reserve status who are selected for this clinical clerkship must volunteer to perform not more than 60 days of active duty for training, including travel. Students who are assigned to a USAR Control Group (Annual Training) will fulfill their annual requirement for active Reserve participation by performing the above period of active duty for training. The students who are assigned to a TOE or TD Reserve Unit, or a USAR School, will perform this training "in lieu of" the annual unit training (summer camp) requirement with their unit.

The program will consist of approximately eight weeks of instruction at Army teaching hospitals, which will be devoted to military medicine and other military instruction, and the remaining time will be divided into two equal periods, one embracing internal medicine and its subspecialties, the other surgery and its subspecialties. A preventive medicine program will also be available and will include one week of general orientation in military organizations, its functions and procedures, followed by detailed observation and assistance in a comprehensive preventive medicine program. Research clerkships are also available in a limited number for selected individuals at Walter Reed Army Insti-

tute of Research. A student, who is selected for a clerkship between his sophomore-junior year, is not eligible to apply for the clerkship between his junior-senior year.

Senior Medical Student Program

Selected senior medical students will be commissioned as second lieutenants, Medical Service Corps, U. S. Army Reserve, and will be permitted to continue their studies in their respective schools as officers on active duty with full pay and allowances until they complete their academic requirements for the degree of doctor of medicine. Upon completion of their medical education, selected students will be required to accept appointments in the grade of first lieutenant, Medical Corps, U. S. Army Reserve; they must agree to participate in the National Intern Matching Program, Incorporated, and serve on active duty for three years immediately following their civilian or military internship. This includes time obligated under the Universal Military Training and Service Act, if applicable. Participants who are not matched for an Army internship will be released from active duty for one year to allow them to complete a civilian internship, and they will then be recalled to active duty for three years at the end of the 12-month period.

Military Intern Program

Selected graduates of approved medical schools will be commissioned as first lieutenants, Medical Corps, U. S. Army Reserve, and will be ordered to active duty for the purpose of completing a 12-month internship in a military hospital. Individuals participating in the program will not incur obligatory service; however, those individuals who will be liable for military service under the provision of any law will be required to serve that obligation immediately upon completion of their internships. Military interns will be encouraged to apply for Regular Army and residency training.

Applicants must agree to participate in the official cooperative plan of internship appointments for first-year internships as conducted by the National Intern Matching Program, Incorporated.

Military Resident Program

Personnel selected for participation in the Military Resident Program will be commissioned in the Regular Army Medical Corps; those who are not members of the Regular Army Medical Corps will be commissioned prior to assignment to residency training. Attendance at the Company Officer Course for 22 weeks prior to entry into the residency program will be required of those individuals who have not had six or more months of duty with a tactical unit as a Medical Corps Officer. Selections will be made from among qualified applicants in accordance with the needs of the Army in the various specialty fields. Individuals placed in residency training will be required to serve one year on duty status for each year of training received.

In the event spaces in the specialty requested are not available in Army hospitals on one of the next three starting dates after receipt of application, opportunity may be offered to applicants approved for Regular Army to obtain residency training in a Veterans Administration Hospital, Gorgas Hospital, Ancon, Canal Zone, or any other civilian hospital approved by the Council on Medical Education and Hospitals of the American Medical Association, to fill existing requirements. Individuals participating in the program in civilian hospitals under this policy are required to serve on active duty for two years for the first year of training received and one year for each subsequent year.

NAVY

The Ensign, 1995 (Medical) USNR Program

After passage of the Selective Service Act of 1940, many medical students who were obligated for military service by the act indicated their desire to affiliate with the Naval Reserve in order to assure that their period of active duty would be with the Navy's Medical Department. To make this possible and to provide deferment from active duty until graduation, the Ensign, Probationary (Medical) Program was established before the onset of World War II. The first appointments late in 1941 were limited to third-and-fourth-year medical students attending class "A" (approved) medical schools. Within a few months, however, the program was expanded to include first-and-second-year medical students, and it has since come to be known as the Ensign, 1995 (Medical) Program.

The number "1995" is a designator used to identify officers within the Department of the Navy by a code system. The first three digits, 199, indicate that the officer is under instruction in a civilian school; the last digit, 5, indicates an officer of the Naval Reserve. Thus, 1995 followed by (Medical) refers to an officer of the Naval Reserve with the rank of ensign under instruction in an accredited medical school.

The qualifications for appointment as Ensign, 1995 are as follows:

A. Sex: Men and Women

B. Age:

(1) Candidates with no prior military service should be at least 19 and of such age that upon expected date of graduation, they will be under 33. The maximum age limit with prior active military service may be adjusted on a month-for-month basis, depending upon the number of months of active military service performed, but in no case to exceed 36 months. Applications cannot be accepted from any person who will have passed his or her 36th birthday when he or she becomes eligible for super-

seding appointment in the grade of Lieutenant (junior grade) following graduation from medical school.

C. Educational

(1) Should be within 120 days of completion of all academic work required for enrollment in medical school.

(2) Should be in attendance or have been accepted for and be within six months or less of the date of the next entering class at one of the American or certain of the Canadian medical schools accredited by the Council on Medical Education and Hospitals of the American Medical Association, including approved schools of the basic medical sciences in the United States and Canada. Applications cannot be accepted from students who will attend a medical school in a foreign country other than Canada. Appointment of students who will attend a Canadian school will depend upon the proximity of the school to an Office of Naval Officer Procurement.

(3) Should NOT have commenced the final year of medical school.

D. Professional:

(1) Applicants are required to establish professional fitness and aptitude for the Naval Service through interviews and a review of college and employment records.

E. Physical Standards:

(1) Should be found physically qualified for appointment to commissioned status in accordance with established regulations.

The primary objectives of this program are to provide (1) an opportunity for qualified medical students to affiliate with the Naval Reserve as commissioned officers while still in medical school; (2) assurance that these officers will be able to complete their medical studies and internship prior to fulfilling their obligation for active military duty; (3) assurance that, when they do enter the service, it will be within the Navy's Medical Department; and (4) a primary source of qualified candidates for the Naval Intern Program and for the Medical Corps of the Navy and Naval Reserve.

As an added incentive for membership in the Ensign, 1995 Program, there has been established a 30-60 day active duty research clerkship training program at naval research activities throughout the United States. This program provides orientation and indoctrination into medical research as well as on-the-job training for the undergraduate medical student during his vacation from medical school. Full pay and allowances are authorized for these officers while so serving on active duty. Medical students who are commissioned as Ensign, 1995 (Medical) USNR and who have successfully completed the first year of medical school are eligible to participated in this program. Research clerkships offer a detailed review of the specific research program being conducted at the training activity. A part of the training is spent in each research department, and the trainee serves as an assistant in actual laboratory research on a specific project under way at that time.

Also established are clinical clerkships at Naval teaching hospitals throughout the United States. Beginning July 1 of each year, this program offers the medical student who has completed his second year of medical school 30-60 days of active duty for training during his vacation from medical school. Clinical clerkships are planned to provide indoctrination and orientation into naval medicine, rotation through the major professional services of a Naval teaching hospital, and performance of on-the-job training duties commensurate with the individual's professional attainments.

Each year during the summer months a limited number of mature medical students holding commission as Ensign, 1995 are authorized to participate in NROTC–Midshipmen Cruises. Selections for this important training are made from students who have completed at least their second year of medical school with priority being given those who have completed their third year. Trainees receive an excellent indoctrination and orientation into the practices of Naval medicine aboard ship under the supervision of experienced medical officers of the Regular Navy and Naval Reserve.

To assist the medical student financially, and to attract future doctors of medicine toward a career in the Navy Medical Corps, the Active Duty Senior Medical Student Program was authorized by the Secretary of the Navy two years ago. To be eligible for participation, the individual student must be an Ensign, 1995 (Medical) USNR, or agree to accept such an appointment if selected. Further, he must have completed his third year of medical school and be eligible for enrollment in the ensuing year. During attendance in medical school, these officers serve on active duty, receiving the full pay and allowances of their rank. In return for participation in this program, the individual serves one year plus the 24 months obligated by the Universal Military Training and Service Act, as amended.

Here are some important facts concerning the Senior Medical Student Program:

(1) This program is open to qualified students enrolled at medical schools accredited by the Council on Medical Education and Hospitals of the American Medical Association. Students who have completed their second year of medical school may make application for this training at an Office of Naval Officer Procurement. Active duty commences and continues while in attendance during their senior academic year. To be eligible for participation, he must be an Ensign, 1995 (Medical) U. S. Naval Reserve, or agree to accept such an appointment if selected. A board convened in the Bureau of Medicine and Surgery selects the candidates for participation in this program.

(2) Physical standards of this program are the same as those established for Regular Navy staff corps officers.

(3) Active duty orders are mailed to the student via the Professor of Naval Science or the District Commandant. Active duty commences upon receipt of such orders and completion of proper reporting endorsements.

(4) The student agrees, in writing, to accept a Regular Navy commission, and if a Regular Navy commission is not tendered, to accept an appointment in the Naval Reserve.

(5) In accepting an appointment in the Regular Navy or Naval Reserve, as a result of having active service in the Senior Medical Student Program as an Ensign, 1995, he is obligated to serve on active duty and to retain the commission for a period of three years. This active service will commence upon completion of not more than 12 months of a civilian or Naval Internship. Providing that the student has 24 months obligated military service to perform, this active duty affords a splendid opportunity to discharge the military obligation and serve an additional year in return for the benefits received in the Senior Medical Student Program. With no obligated military service to perform, upon enrollment in the Senior Medical Student Program, the student obligates himself to retain his commission for the same period of three years.

(6) As a medical student, he receives the full pay allowances of an Ensign, 1995, while so enrolled on active duty. Pay and allowances are based on longevity as follows:

(*a*) Less than two years and no dependents, he receives $338.58 per month; with dependents, (a member of his family or household dependent upon him for financial support) he receives $355.68 per month.

(*b*) Over two but less than three years and no dependents, he receives $353.40 per month; with dependents, he receives $370.50 per month.

(*c*) Over three but less than six years and no dependents, he receives $412.68 per month; with dependents he receives $429.78 per month.

(7) In addition to the pay and allowances, the student is credited with 2½ days of annual leave for each 30 days of active duty served.

(8) The wearing of the Naval uniform is permitted only when authorized by appropriate naval authority.

(9) Timing is very important. An average of four months is required to completely process each application. Feb. 1 each year is the absolute deadline that completed applications must be forwarded to the Bureau of Naval Personnel, Navy Department, Washington, D. C. This is necessary so that sufficient time is given to the board in the Bureau of Medicine and Surgery to pass on the professional qualifications, and the board in the Bureau of Naval Personnel to pass on the over-all qualifications of each applicant. Those selected are required to meet the moral, mental, and physical standards of Navy acceptance. All applicants will be notified by individual letter of their acceptance or rejection not later than the first week in May.

(10) Upon completion of the sophomore year of medical school, the student desiring to enroll in the Senior Medical Student Program should make application at the nearest Office of Naval Officer Procurement located in the following cities:

Albany 1, N. Y.	Albuquerque, N. Mex.
Boston 9	Buffalo 3
Butte, Mont.	Chicago 11
Cincinnati 2	Dallas 2, Texas
Denver 2	Houston 2, Texas
Detroit 26	Kansas City, Mo.
Los Angeles 17	Macon, Ga.
Minneapolis 1	Nashville, Tenn.
Raleigh, N. C.	St. Louis 1
Salt Lake City	San Francisco 2
Seattle 1	Washington 25, D. C.
Philadelphia 7	Pittsburgh 19
New Orleans 16	Omaha 11, Neb.

Naval Internships

A Naval Internship is 12 months in duration, of the rotating type, and is conducted in such a manner as to conform with the requirements of the Council on Medical Education and Hospitals of the American Medical Association and its publication, "Essentials of an Approved Internship," of Dec. 1, 1955.

During the forthcoming year naval internships will be offered at the U. S. Naval Hospitals located at Chelsea, Mass.; Newport, R. I.; St. Albans, N. Y.; Philadelphia; Bethesda, Md.; Portsmouth, Va.; Charleston, S. C.; Jacksonville, Fla.; Pensacola, Fla.; Great Lakes, Ill.; Bremerton, Wash.; Oakland, Calif.; Corona, Calif.; Camp Pendleton, Calif.; and San Diego, Calif.

Naval Internships are not mandatory upon the Ensign, 1995 (Medical) officers. In fact, this is a separate program sponsored by the Navy, offered through the National Intern Matching Program Incorporated to senior medical students of approved schools in the United States, and to the eligible American students in the approved schools in Canada.

These internships compare most favorably with the best civilian hospital internships and each year the number of applicants exceeds the number of Naval internships available, usually by a ratio of two or three to one. It is not required that a senior medical student be a participant in the Ensign, 1995 (Medical) Naval Reserve program in order to apply and be accepted for a Naval Internship.

For this reason, if the Ensign, 1995 does not desire a naval internship, but wishes to select a civilian internship, he should list only the civilian hospitals, in the order of his preference, when applying

through the matching plan; thus, he will not be competing with those who do want naval internships, and request to be so matched.

If an Ensign, 1995 enrolls in the Medical Student Program and chooses a civilian internship rather than a naval internship, he will be on inactive duty during this period. Following completion of the civilian internship, he will be immediately placed on active duty in compliance with the previous service agreement.

The basic requirements for an applicant applying for a Naval Internship are as follows: (1) be a graduate or potential graduate of a medical school listed as approved by the Council on Medical Education and Hospitals of the American Medical Association; (2) be a citizen of the United States; (3) be registered with and his name appear in the Official Directory of Students published by the National Intern Matching Program; and (4) meet the prescribed physical standards for a commission in the United States Naval Reserve.

Clinical pathological conferences, tumor boards, supervised ward rounds, basic sciences indoctrination, audiovisual educational aids, seminars, regular and special staff meetings, small group discussions of clinical problems and journal clubs in Naval hospitals are well organized, and interns are encouraged and given ample opportunity to take part in these activities. Interns are also permitted to devote special attention, perform reference work, and do clinical research in connection with their most outstanding or instructive cases and to prepare their materials for submission for publication in leading medical journals.

Salary.—A medical school graduate accepted as an intern will be commissioned as lieutenant (junior grade), Medical Corps, United States Naval Reserve and will receive the compensation and privileges of his rank. Interns with dependents receive $5,729.76 per year while those without dependents receive $5,524.56 per year. Currently promotion to the rank of lieutenant usually occurs early in the internship training period. After such promotion, the amount received per year will be increased to $6,298.56 for those with dependents and to $6,129.36 for those without dependents.

In order to become eligible for consideration for Naval internship, candidates must first file application for commission in the Naval Medical Corps. Application forms may be secured by visiting or writing the nearest Office of Naval Officer Procurement or the nearest Naval hospital in the continental United States. In filling out an application form, it is suggested that five hospitals be listed in the order of preference. In all but a few instances, assignments have been made from among the first three listed. It is important for medical students applying for internship in the Navy or other Federal Services to observe the following quotation which is excerpted from the "Directory of Approved Hospitals Participating in the Matching Program for Internship Appointment," of 1956, published by the National Intern Matching Program, Chicago 1: "Please note that in applying for internship training in the Air Force, the Army, the Navy, or the Public Health Service, the student applies, insofar as the matching is concerned, directly to the service involved and not to a specific hospital. The student, however, may be requested, by the government service involved, to designate several service hospitals in order of choice. If matched, the service will attempt to meet the student's first choice. In cases where this is not possible, the student may be assigned another of his choices within that service. Each service is completely separate, and this assignment to a particular hospital is entirely performed by the service involved. In the matching program the student is matched only to the service itself, and not to a particular hospital within it. The government services do not issue internship contracts."

Applications for commission in the Naval Medical Corps for intern training are accepted between Sept. 1 and Dec. 1 of each year. That portion of the application pertaining to internship is accepted between Oct. 1 and Dec. 1 in accordance with the provision of the National Intern Matching Program. There is no obligated service requirement for Naval internships. The year served on active duty as an intern does not satisfy any portion of the obligation imposed by the provisions of the Universal Military Training and Service Act, as amended.

In order to permit the processing of application in sufficient time to meet all deadline dates, it is vitally essential that candidates submit their application as early as possible after Sept. 1.

Any additional information may be obtained, upon request, from the Bureau of Medicine and Surgery, Department of the Navy, Washington 25, D. C.

Naval Residency Training Programs

Nine U. S. Naval Hospitals are now approved for residency training in the various clinical specialties of medicine and surgery by the Council on Medical Education and Hospitals of the American Medical Association and by the respective American Specialty Boards. These naval hospitals are located at Chelsea, Mass.; St. Albans, N. Y.; Philadelphia; Bethesda, Md.; Portsmouth, Va.; Great Lakes, Ill.; Oakland, Calif.; Corona, Calif.; and San Diego, Calif. Residency training for medical officers is also actively sponsored by the U. S. Navy in selected outstanding civilian hospitals, schools, and medical centers of the United States in those few specialties wherein the Navy does not operate formalized training programs. U. S. Naval Hospital residency training activities embrace the specialties of allergy, anesthesiology, cardiovascular disease, dermatology and syphilology, general practice, internal medicine, neurology, obstetrics and gynecology, ophthalmology, orthopedic surgery,

otolaryngology, pathology, pediatrics, psychiatry, radiology, surgery, thoracic surgery, and urology. Formally approved training in civilian institutions is conducted in plastic surgery, neurological surgery, preventive medicine and public health, and in children's orthopedic surgery.

Medical officers eligible for assignment to duty as a resident are Regular Navy officers and those Reserve medical officers who have completed their active service obligations under the Universal Military Training and Service Act, as amended. Requests for residency training duty should be forwarded to the Chief of the Bureau of Medicine and Surgery, Navy Department, Washington 25, D. C. All such requests are acted upon by the Bureau Advisory Board on professional training matters. This board makes recommendations in accordance with the merits of each case, taking into consideration the professional experience, background, and aptitude of the candidate and the needs of the service in the particular specialty in which training is desired. One year of obligated service is required for each year of training received in a Naval hospital. Two years of obligated service are required for the first year of training received in civilian institutions and one year of obligated service for each successive year so spent.

It is the policy of the Bureau of Medicine and Surgery to continue a resident in training until formal requirements, leading to eligibility to undergo examination by an American Specialty Board, have been met. This procedure will be strictly adhered to in every case where the needs of the service permit, barring national emergencies, provided that such an arrangement remains mutually agreeable and satisfactory aptitude and progress as a resident are demonstrated. The highest priority in the assignment of naval medical officers to residency training is given those who have completed or are about to complete a normal tour of active duty with an operational unit of the U. S. Navy at sea or on foreign shore stations.

Other Graduate Training for Naval Medical Officers, Including the Military Medical Specialties

Aviation Medicine.—The School of Aviation Medicine at Pensacola, Fla., convenes four classes annually of approximately 30 students, for didactic instruction in aviation medicine and actual instruction in flight and ground school. Upon completion of this course of instruction they are designated naval flight surgeons. Additionally, the School of Aviation Medicine is approved for residency training in aviation medicine. This training consists of one year of public health at a civilian institution and two years of residency training in aviation medicine at the School in Pensacola. Upon completion, successful candidates are assigned to operational units under the preceptorship of Board certified flight surgeons for a period of three years. They are then considered Board eligible for certification in aviation medicine. Further opportunities are available in several large Naval laboratories for work in research related to aviation medicine. The laboratories are located at Johnsville, Pa., Philadelphia, and the School of Aviation Medicine, Pensacola, Fla. A medical officer interested in the aeronautical aspects would do well to consider this advanced training.

Submarine Medicine.—This military medical specialty supports all phases of underwater operations in the Navy. Training in this specialty is particularly applicable to those having an interest in occupational or preventive medicine and research in physiology. The basic six months course of training includes lectures, demonstrations, laboratory work, practical experience, and cruises in submarines, rescue vessels, and tenders as available. The majority of the course is given at the Submarine School and Medical Research Laboratory at the Submarine Base, New London, Conn. Eight weeks of the six months' period is spent at the U. S. Naval Deep Sea Diving School, Naval Gun Factory, Washington, D. C., where the student learns about diving by making dives and about the physiological problems involved through classroom and laboratory periods.

Upon completion of a tour of duty with an operational unit the medical officer may apply for postgraduate training in various fields. He may prepare himself for later certification in occupational medicine by attending the academic year at the University of Rochester and later service in nuclear powered submarines or surface vessels. He may prepare for certification in preventive medicine by attending one of the public health schools and subsequent field duty ashore and afloat. He may prepare himself for a career in research by a postgraduate year at the University of Pennsylvania College of Medicine followed by duty at Naval laboratories and with operational units. Clinical medical specialty training in all fields is available and having served with operational units is an additional credit to one's application.

Research Program.—The Navy offers 60 Navy medical officer billets for military medical research careers. These opportunities embrace basic medical research in aviation medicine, submarine medicine, amphibious and field medicine, tropical and exotic diseases, and in the areas of the medical problems of nuclear, biological, and chemical warfare defense. These 60 billets are distributed among 15 in-service laboratories, strategically located throughout the world, and represent the program indicated above.

Amphibious and Marine Corps Field Medicine.—Recognized as an important military operational medical specialty, this training is conducted at Camp Lejeune, N. C., Camp Pendleton, Calif., and the Marine Corps Educational Center, Senior School, Quantico, Va. This specialty offers valuable

training in the methods of sorting (triage), management, and evacuation of mass casualties, research and development of field medical equipment, field sanitation methodology and practices, medical logistic support, large scale medical planning, and efficient patient care in field combat, including arctic and tropical medicine.

Nuclear Medicine.—Graduate courses for medical officers are conducted at five U. S. Naval institutions. Additional graduate courses in radiobiology are sponsored by the Navy for medical officers at Reed College, Portland, Ore., and the University of Rochester, Rochester, N. Y. Formal long courses for radiology and other residents are conducted in the clinical use of radioisotopes at the U. S. Naval Medical School, National Naval Medical Center, Bethesda, Md. This latter course is approved by the Atomic Energy Commission and is designed to fulfill the needs of those who wish to appear for future examination for certification by the American Board of Radiology, as well as those residents in other specialties who may need to acquire a better understanding of the clinical utilization of radioisotopes in diagnostic and therapeutic procedures.

AIR FORCE

The Air Force is presently sponsoring training programs for senior medical students, as well as internships and residencies in both civilian and military hospitals. Applicants must be United States citizens, be morally, physically, and educationally qualified, and must not be nor have been conscientious objectors. Eligibility varies with each program according to the applicant's age.

The Senior Medical Student Program

The Senior Medical Student Program offered by the Air Force is available to 200 students each year. The application period for this program is Nov. 1 to March 1 of the junior year. Those selected are commissioned as second lieutenants and are sponsored from the date of matriculation to the date of graduation. Upon graduation they must agree to accept reappointment as first lieutenants and apply for either a military or a civilian-sponsored internship. Those not selected for intern training are released from active duty for one year to intern under private contract. Selected students incur a three-year obligation for sponsorship of the senior year. No additional obligation is incurred if they are selected for a sponsored internship.

Air Force Sponsored Internships, Civilian and Military

The Air Force Intern Training Program, begun in 1950, is designed as a regular officer procurement program. Each year the Air Force sponsors 84 applicants in military internship selected through the National Intern Matching Program and also sponsors 140 interns in approved civilian hospitals. To be accepted, applicants must meet general eligibility requirements stated above, must not be more than 32 years of age, and must be graduates of medical schools acceptable to the surgeon general.

Selection for civilian internships is made periodically by the office of the surgeon general on the basis of scholastic standing, physical fitness, and military aptitude and inclination. Applications for sponsored civilian intern training beginning July 1 are closed as of April 1 each year; closing date for applications for training beginning on "off-term" dates is announced by letter annually. For military internships, applications must be submitted not later than Dec. 1. Those selected are appointed effective the date of graduation from medical school as first lieutenant, Air Force Reserve (Medical). Military interns incur a minimum period of obligated service of 24 months and civilian interns, 36 months, regardless of their Selective Service classification. However, their military service obligation under the Universal Military Training and Service Act, as amended, will be discharged concurrently with this service.

Civilian interns are assigned to the hospital at which they have obtained an approved internship. Since the program is designed to cover the normal one-year internships, students who have accepted appointments to internships longer than 12 months are not favorably considered for this program. (They may not accept any remuneration from the hospital.)

Military interns are not assured assignment in any specific military hospital, but almost all are assigned according to their first, second, or third choice. Military internships are of the general rotating type so that applicants gain appropriate experience in various fields of medicine. Training is directed by military and civilian physicians and includes a wide range of clinical material, utilizing modern medical, surgical, and radiological facilities. It provides for one year of formal training in accordance with the requirements of the Council on Medical Education and Hospitals of the American Medical Association and is followed by two years of general medical duty in Air Force installations.

Residency Training Program

The Air Force residency training program, limited to members of the Regular Air Force, is conducted in both military and civilian hospitals (including nonmilitary government hospitals). For the year beginning July 1, 1958, the Air Force programmed for 319 training spaces in civilian hospitals and 121 in military hospitals.

Physicians who enter this program are expected to remain in training until they have completed the minimum formal training requirements of the specialty boards. Interns selected for this training may enter directly from their internships without interruption if their applications are submitted in time. To be accepted, they must qualify for a Regular Air Force commission, must be a graduate of an accredited medical school, and must have

completed a minimum of one year of internship in an approved hospital. Applications for residency training and a regular commission may be submitted simultaneously and may be submitted at any time after completion of three months of internship. For each year of sponsored training in a military hospital, the period of obligated service incurred is one year; in civilian hospitals, the obligation is two years for the first year of training and one year for each additional year. Air Force–sponsored interns who undertake a combined internship-residency program will be required to serve only one year of obligated service in repayment for one year of internship, military or civilian, when they successfully complete the minimum formal training requirements of a medical specialty board, if the residency is three or more years' duration. If the residency is for two years, the obligated service time for internship will be reduced only one year (i. e., to two years for civilian interns and one year for military).

Air Force residency training is available in all recognized medical specialties, including allergy, anesthesiology, aviation medicine, cardiology, dermatology and syphilology, gastroenterology, general practice, general surgery, internal medicine, neurology, neurosurgery, obstetrics and gynecology, occupational medicine, ophthalmology, orthopedic surgery, otolaryngology, pathology, pediatrics, physical medicine, preventive medicine, psychiatry, pulmonary diseases, radiology, thoracic surgery, and urology.

The Aviation Medicine Specialty Training Program, leading to board certification in Aviation Medicine, is a comprehensive program of five years' duration. Applicants must be graduates of the Primary Course of Aviation Medicine and have had a minimum of nine months' practice as an Aviation Medical Examiner.

Applicants must be physically and professionally qualified and be no more than 34 years of age when the class convenes. Applications must arrive at Headquarters USAF not later than Jan. 1 for the program beginning in September. All other applications for sponsored residency beginning July 1 must be submitted by Dec. 1 of the preceding year.

UNDERGRADUATE AND GRADUATE MEDICAL TRAINING PROGRAMS IN THE VETERANS ADMINISTRATION

The following material reviewing the Undergraduate and Graduate Medical Training Programs in the Veterans Administration has been submitted by the Director, Education Service, Research and Education, Department of Medicine and Surgery of the Veterans Administration.

The policy of association of medical schools with VA hospitals followed passage of Public Law 293, 79th Congress, January, 1946, and resulted in the participation of approximately 100 Veterans Administration hospitals in graduate and undergraduate medical education activities. These activities are, for the most part, conducted by medical school faculties acting under the supervision of deans committees. These committees are composed usually of heads of the major departments in the medical schools, are nominated to the Veterans Administration by the deans, and members are appointed by the chief medical director through a formal letter. This relationship is maintained to the mutual benefit of both the participating medical schools and the participating VA hospitals without any additional contractual or other legal agreement. The conduct of medical education activities in VA hospitals has resulted in marked strengthening of the medical care program of the Veterans Administration.

The Veterans Administration is formally associated in undergraduate, graduate, and postgraduate medical education with 72 medical schools in the United States and Puerto Rico. This association is with 70 approved four-year medical schools, plus Dartmouth Medical School, and Albert Einstein College of Medicine. Those medical schools not having formal association with the Veterans Administration are the University of Chicago, University of North Carolina, the Medical College of South Carolina, University of Tennessee College of Medicine, Meharry Medical College, University of Texas Medical Branch (Galveston), University of Virginia School of Medicine, University of Missouri School of Medicine, University of North Dakota School of Medicine, University of South Dakota School of Medical Sciences, and West Virginia University School of Medicine. For most of the above schools, the reason for nonaffiliation is geographical. Several of these medical schools maintain informal relationships with VA hospitals, and one provides a Medical Advisory Committee from its department of psychiatry and neurology to serve a VA hospital.

UNDERGRADUATE MEDICAL EDUCATION

For the academic year 1956-1957, 61 medical schools assigned medical students to 60 VA hospitals. Of these hospitals, 50 were general medical and surgical, 7 were neuropsychiatry, and 3 were tuberculosis hospitals. Thirty-one medical schools send all of either the third or fourth year classes to VA hospitals for clerkship experience. Forty-seven schools supply clerks in internal medicine, 45 schools supply clerks in surgery, and 25 schools supply clinical clerks in psychiatry and neurology.

The latest previous survey revealed that for the year 1954-1955, 3,903 clerks served in VA hospitals. For 1956-1957, 4,999 third-and-fourth-year clerks were on duty. This total is composed of 2,708 third-year clerks or 39% of the third-year students enrolled in all medical schools. There were 2,291 fourth-year clerks, or 33% of all fourth-year students enrolled in medical schools. The number of hospitals receiving first-or-second-year students for

varying degrees of clinical experience including physical diagnosis is not listed but continues to increase yearly.

GRADUATE MEDICAL EDUCATION

Although residency training programs were first inaugurated in Veterans Administration hospitals in conjunction with medical schools and under supervision of deans committees, there have been certain changes as the program has evolved over the past 10 years. There are certain large VA hospitals with competent staffs which are not located conveniently near medical schools but which are capable of conducting adequate residency training. For nine of these hospitals a substitute for the deans committee has been created and is known as a medical advisory committee. It is composed of highly qualified consultants from the surrounding community and has duties and responsibilities similar to those of deans committees. There are two VA hospitals which conduct residency training without the aid of either a deans committee or a medical advisory committee. On the other hand, the existence of a medical school relationship and a deans committee does not invariably mean that residency training is conducted. There are certain small hospitals which benefit materially from medical school association but for which it is not feasible to inaugurate residency training programs. There are now eight such VA hospitals whose postgraduate and inservice training programs for full-time employees are supervised by deans committees but in which residency training programs are not contemplated.

There are accordingly 92 VA hospitals conducting residency programs. Of these, 81 are supervised by deans committees, 9 by medical advisory committees, and 2 have residency programs without any non-VA supervision. There are 90 hospitals with deans committees, of which 81 conduct residency programs, 8 conduct no residency programs, and one receives residents on an affiliate status. There is an increasing trend for non-VA hospitals to send residents for affiliate training to VA hospitals even though the VA hospitals do not have a deans committee, medical advisory committee, an existing residency program. There are two such hospitals now receiving residents and several more are negotiating for such relationships.

Veterans Administration hospitals support residency training in 21 specialties. The attached table (table 46) reveals the specialties and the numbers of residents on duty as of January, 1957. The total number of 2,542 VA residents represented 12% of the total on duty in the United States for 1955-1956. Noncitizen residents cannot be employed by the Veterans Administration but are permitted to serve without compensation in VA residency training programs on an exchange rotation basis when they are bona fide appointees of university hospitals.

Because of the serious recruitment needs of the Veterans Administration for certain scarce categories of full-time personnel, "career" residency training programs have been inaugurated for the purpose of providing approved residency training to physicians who are paid not a residency stipend, but on a full-time basis. Under such an arrangement, the residents agree to provide a further period of obligated service at the completion of their training and in hospitals selected by the Veterans Administration. There are 241 such residents serving on a career basis distributed in the specialties of anesthesiology, neurology, physical medicine, psychiatry, and radiology. On July 1, 1957, a small career residency program was added in pathology.

Within the total of 2,542, there are 216 fourth-year residents and 31 fifth-year residents. Table 47 reveals the maximum stipends now permissible for

TABLE 46.—*Veterans Administration Residents January, 1957*

	Career Residents	All Other Residents	Total Residents
Allergy	...	1	1
Anesthesiology	6	72	78
Cardiology	...	4	4
Dermatology	...	30	30
Gastroenterology	...	8	8
General surgery	...	721	721
Internal medicine	...	662	662
Neurology	22	20	42
Neurosurgery	...	34	34
Ophthalmology	...	56	56
Orthopedic surgery	...	113	113
Otolaryngology	...	28	28
Pathology	...	92	92
Physical medicine	19	4	23
Plastic surgery	...	9	9
Proctology	...	1	1
Psychiatry	184	193	377
Pulmonary diseases	...	6	146
Radiology	10	136	146
Thoracic surgery	...	24	24
Urology	...	87	87
Totals	241	2,301	2,542

VA residents. Board, room, and laundry are not provided free and there are no additional fringe benefits. As of Jan. 1, 1957, 110 or approximately 4% of all VA residents were graduates of foreign medical schools, although citizens of the United States.

Of great interest is the developing trend to combine residency training programs between several hospitals on a community basis. Veterans Administration hospitals participate in this activity on a basis of local determination, but the Department of Medicine and Surgery encourages this development wherever possible. Where there is a complete combination of resident selection and appointment and of training facilities between several hospitals, and where the VA hospital is listed by name as one of the participating members under the "indented listing" scheme of the approved programs published in THE JOURNAL, such residency programs are known

as "integrated" programs. Of the total of 585 approved residency programs in the Veterans Administration, 30% are conducted on an integrated basis. Where a Veterans Administration hospital maintains full approval for a residency program in its own name even though residents are rotated to other institutions with approved programs, the designation is a "Collaborating" program. Fifty per cent of the existing approved residency programs are now conducted on a collaborating basis. Where a Veterans Administration hospital has no approval for the conduct of residency programs on either a collaborating or an integrated basis, but where it merely accepts residents by detail from a hospital conducting approved training, the designation of "affiliate" residency training is used. Approximately 7% of the VA programs are conducted on this basis. The remaining 13% of VA residency programs carry independent approval and are conducted wholly within VA facilities without a relationship to other hospitals.

Because over 50% of the patient load of Veterans Administration hospitals is for psychiatric or neurological disability, it is to be expected that residency training will be emphasized in this special category. For the year 1955-1956, the residents in psychiatry throughout the United States constituted 9% of the total residents on duty in all hospitals. For that same year, the residents in psychiatry in Veterans Administration hospitals constituted 15% of all the psychiatric residents in the United States and constituted 20% of all residents on duty in Veterans Administration hospitals. It is evident, therefore, that residency training in psychiatry in Veterans Administration hospitals receives greater emphasis and support than does residency training in psychiatry throughout the country in relation to all residents in all specialties.

TABLE 47.—*Resident Stipends (Maximum)*

	Per Year
Junior Resident	$2,840
Intermediate Resident	3,195
Senior Resident (1st year)	3,550
Senior Resident (2nd year)	4,000
Senior Resident (3rd year)	4,500

Residency training in Veterans Administration hospitals emphasizes the team concept of hospital medical and dental care programs. Graduate training in dentistry is conducted in 26 VA hospitals in affiliation with 21 of the 46 dental schools of the United States. In the fields of nursing, hospital administration, and the paramedical specialties there are 4,638 trainees. The coexistence of these training programs with medical residency programs produces a hospital and clinic environment mutally beneficial to both programs. While yielding an essential service to patients, these training programs make a significant contribution to the trained manpower pool of the United States.

PARAMEDICAL SCHOOLS

SCHOOLS FOR MEDICAL RECORD LIBRARIANS

The Council has worked closely with the American Association of Medical Record Librarians since 1942 in the development of criteria for and evaluation of educational programs in medical record library science. Initial and continued approvals of schools are considered by the Council on the basis of the recommendations of the Committee on Education and Registration of the American Association of Medical Record Librarians, which has an able education director who makes periodic survey-visits to schools. Significant studies to further advance training in the field are being carried out effectively by the American Association of Medical Record Librarians.

Revision of the curriculum currently recommended by the Council and the American Association of Medical Record Librarians is under consideration. Revisions will be gradually implemented and based upon studies which will not be completed for several years.

At the present time there are 30 approved schools. Student enrollment increased in 1956 to 145 students in the senior class of degree programs and in certificate programs, which represents nearly a 7% increase over 1955. There was a training capacity for 262 students in these programs, but five schools had no students enrolled during 1956. Accordingly, the occupancy rate was 53% for the senior class of 7 degree programs with senior students in 1956 and 72% in the 19 active certificate programs. Since students were separately enrolled in both programs offered by one school, students were enrolled in 26 programs offered by 25 schools. The number of graduates for seven degree programs was 33. In addition, there were 74 graduates from 13 certificate programs or a total of 107 graduates from 19 schools in 1956.

Approved schools offer curriculums which include theoretical instruction and practical training in hospitals. When the hospital training is sequentially and properly integrated with collegiate studies, a degree is available after four years of study. Among the 10 schools offering degree programs, 8 admit qualified high school graduates and 2 schools offer a curriculum of 12 months' duration with admission requirements of three years of preparatory collegiate preparation. In the 21 schools offering certificate programs of one year's duration, 17 require two years of college prior to admission. All but one of these 17 schools will also admit graduates from an accredited school of professional nursing of at least three years' duration. A college degree is required for admission into four certificate schools. Twenty-five schools, one of which offers both degree and certificate programs, are conducted by or in affiliation with colleges or universities. Lists of

approved schools are available from the Council. Applicants should write directly to the Medical Record Librarian–Director of the School.

Schools conducting degree programs usually begin in June, and the majority of certificate programs admit students in September. Tuition ranges from $66 to several hundreds of dollars per year and one school requires none. Application for approval by a hospital or university should be made to the Council on Medical Education and Hospitals of the American Medical Association. Inquiries regarding career opportunities and registration of qualified medical record librarians should be addressed to the American Association of Medical Record Librarians, 510 N. Dearborn St., Chicago 10.

SCHOOLS FOR MEDICAL RECORD TECHNICIANS

Schools for medical record technicians are conducted to train the medical record technician who, working under the supervision of a qualified medical record librarian or a medical record committee, performs the technical tasks associated with the maintenance and custody of medical records.

As in the case of schools for medical record librarians, the Council has developed educational criteria for and evaluates schools in close collaboration with the American Association of Medical Record Librarians.

The training of medical record technicians should be conducted in acceptable general hospitals having a minimum of 4,000 annual admissions. These admissions should include an adequate distribution of patients in the various clinical services commonly found in general hospitals. Candidates for admission to an approved school should be proficient in typing and preferably also in shorthand. They should have completed the requirements for high school graduation or should have passed a college entrance examination for admission to an accredited college or university. The minimum length of training is nine months and should include theoretical instruction in anatomy, medical terminology, and medical records, with additional practical training in admitting and discharge procedures, indexing, preparation of reports, and other activities associated with the medical record department.

There are 10 hospitals approved by the Council for training medical record technicians. These schools reported a training capacity for 69 students with an enrollment of 55 students and 37 graduates in 1956. Data for 1955 are eight schools with a training capacity for 50 students, an enrollment of 35 and 28 graduates. Qualified high school graduates are accepted for courses of from 9-12 months' duration.

Hospitals should apply to the Council on Medical Education and Hospitals for approval. Special forms will be supplied for this purpose, and, when the required information has been received, the proposed training program will be reviewed in collaboration with the Committee on Education and Registration of the American Association of Medical Record Librarians. The institutions applying for Council approval will, in all instances, receive full information and every possible assistance in the planning and development of training programs in accordance with present standards. There continues to be an acute shortage of qualified medical record librarians and medical record technicians. Excellent opportunities exist for graduating students. Inquiries on career opportunities, registration, and accreditation of qualified medical record personnel should be addressed to the American Association of Medical Record Librarians, 510 North Dearborn St., Chicago 10.

SCHOOLS FOR MEDICAL TECHNOLOGISTS

In its continuing efforts to assist hospitals in the development of training programs for medical technologists, the Council cooperates closely with the American Society of Clinical Pathologists, the Board of Schools of Medical Technology, and the Board of Registry of the Society. The board of schools was established by the society in 1949 to serve as the major advisory body to the Council in all matters relating to standards and the evaluation of educational programs. Revisions of the standards occurred in 1941, 1943, 1947, 1949, and 1953. In 1956, the requirement for training in electrocardiographic technique was deleted from the curriculum in the "Essentials of an Acceptable School of Medical Technology." The Board and Council encourage that such training be continued when the pathologist-director considers it advisable.

The board of schools assists the Council in the evaluation of new applications and annual reevaluations of approved schools. A survey program is carried out by regional surveyors appointed by the board of schools. These pathologists visit all new schools and, in addition, periodically revisit approved schools. An extensive resurvey of existing educational programs is actively in progress by pathologists appointed by the board who make an invaluable contribution to the program in experience and time. The recommendations of the board on new applications and existing schools of medical technology are submitted to the Council for its consideration.

There are 656 schools presently approved by the Council, or an increase of 6% over the 618 approved as of Sept. 22, 1956. Enrollment increased 4% to 2,903 students in 1956 and the number of graduates was 2,140, which represents a 3% increase over 1955. With a student capacity of 4,796, the occupancy rate in 1956 was 61%. The increases in student enrollment and number of graduates reflect the effective recruitment program of the National Committee for Careers in Medical Technology sponsored by the College of American Pathologists, American

Society of Clinical Pathologists, and American Society of Medical Technologists and the concerted recruitment activities of the faculties of approved schools and affiliated colleges and universities.

The admission requirement to an approved school of medical technology is two years of college, including certain required courses, in a college or university accredited by a recognized association. Eighty-two per cent, or 536 training programs, base admission on this minimum requirement; 91 (14%) require three years of preclinical college education; and 29, or 4%, require a baccalaureate degree for admission. It should be noted that the following preferences were indicated by pathologist-directors in their consideration of applicants for admission: 63 (10%) specified a preference for students with two years of college preparation; 212 (32%) preferred three years of college; 252 (38%) indicated that preference was given to students with a baccalaureate degree; and 129 (20%) indicated no preference.

The number of hospital schools with college or university affiliations continues to increase. In 1956, a total of 437 hospital schools (67%) had college or university affiliations. Such affiliations are encouraged since they stimulate the development of well-organized training programs suitably integrated with the college curriculum and also serve as a continuing source of students. If properly integrated, a degree is available upon completion of three years of college education followed by one year of hospital training in 409 (62%) of the 656 approved schools. Active liaison between the hospital and the affiliated college is strongly recommended through regularly scheduled meetings of an advisory or coordinating committee comprised of representatives from each faculty. Particular emphasis on such meetings is planned during the next year to encourage this liaison.

The minimum duration of the hospital course acceptable for approval is 12 months. Ninety per cent, or 593 schools, offer a course of 12 months' duration. The remaining 10% of the programs vary from 12½-36 months in length. Tuition is required by 151 (23%) and a minimal breakage fee by 71, or 11%, of the schools. Students receive a stipend in 306 (47%). Room and board are offered in 183 (28%), and board, often consisting of lunches only, in 165 (25%). The remaining 308 schools (47%) offer neither room nor board. All states, the District of Columbia, the Canal Zone, Hawaii, and Puerto Rico have approved schools. Interested high school students should apply to accredited colleges and universities of their choice; those students in college or with collegiate backgrounds should apply to the pathologist-director of the laboratory school of their choice. Lists of approved schools of medical technology, which indicate those schools that have collegiate affiliations, are available from the Council.

Application for approval of a school for the training of medical technologists should be made to the Council on Medical Education and Hospitals of the American Medical Association. Forms will be supplied for this purpose on request and should be completed by the director of the laboratory requesting this approval. Inquiries regarding the registration of qualified medical technologists should be addressed to the Board of Registry of Medical Technologists, 611 W. Howard St., Post Office Box 1209, Muncie, Ind.

SCHOOLS FOR OCCUPATIONAL THERAPISTS

Through a cooperative liaison which began in 1933 on the request of the American Occupational Therapy Association, the Council has developed standards for the education of occupational therapists. These were initially adopted by the House of Delegates in 1935, and subsequent revisions have been approved in 1938 and 1949. Recommendations for periodic revisions of standards and on initial and continued approvals of schools are submitted to the Council by two advisory groups, the Advisory Committee on Occupational Therapy Education of the Council on Medical Education and Hospitals and the Council on Education of the American Occupational Therapy Association. The recently appointed advisory committee consists of nine physician members nominated by national organizations in the fields of chest diseases, general surgery, internal medicine, neurology, orthopedic surgery, pediatrics, physical medicine and rehabilitation, psychiatry, and medical education. In addition, there are three occupational therapist members nominated by the American Occupational Therapy Association and its educational secretary serves as a consultant. Surveys of schools are conducted by joint physician-therapist teams and submitted to the advisory groups which formulate recommendations for final action by the Council. Conferences and basic studies are being carried out by the American Occupational Therapy Association, with the assistance of other organizations, to further advance educational opportunities in the field.

As of June 30, 1957, there were 30 approved schools, 2 of which were on a stand-by basis during 1956. Statistics for total degree and certificate student enrollment and graduates for the academic years 1954-1955, 1955-1956, and 1956-1957 based upon data submitted to the American Occupational Therapy Association were as follows:

Academic Year (Sept. 1-Aug. 31)	Total Student Enrollment	Graduates
1954-1955	2,350	554
1955-1956	2,523	469
1956-1957	2,491	490

Training for an occupational therapist includes a good general collegiate education coordinated with theoretical and technical instruction in occupa-

tional therapy and supervised clinical practice in hospitals. Certificate and/or degree recognition are available and those so recognized have equal professional status. Programs leading to a baccalaureate degree are generally of four years' duration and schools offering this curriculum accept qualified high school students and transfer students. Certificate programs are predominantly from 18 to 24 months in duration and accept students with a baccalaureate degree. However, since schools have individual policies on transfer students, interested undergraduates are encouraged to contact schools of their choice early in their collegiate careers to determine admission requirements for the certificate and/or degree programs in a given school. Tuition in all teaching centers closely parallels college fees. Most courses begin in September or February. Lists of approved schools are available from the Council.

Application by schools for approval of an educational program in occupational therapy should be made to the Council on Medical Education and Hospitals of the American Medical Association. Forms will be supplied for this purpose on request. They should be completed by the administrator of the institution requesting approval. Inquiries regarding career opportunities in the field of occupational therapy and the registration of qualified therapists should be addressed to the American Occupational Therapy Association, 250 W. 57th St., New York 19.

SCHOOLS FOR PHYSICAL THERAPISTS

On the request of the American Physical Therapy Association, the Council developed standards that were adopted by the House of Delegates in 1936. The Council, in cooperation with its advisory groups, the Council on Physical Medicine and Rehabilitation of the American Medical Association and the American Physical Therapy Association, has periodically submitted revised standards to the House of Delegates, which were adopted in 1943, 1949, and 1955. In 1955, the Council on Physical Medicine and Rehabilitation became the Council on Medical Physics, with which there continues close liaison on matters pertaining to physical therapy but which no longer functions in an advisory capacity on physical therapy education. Applications of new schools are reviewed in collaboration with two groups, the Advisory Committee on Physical Therapy Education of the Council on Medical Education and Hospitals, and the American Physical Therapy Association. The Advisory Committee on Physical Therapy Education consists of nine physician members who are nominated by national organizations representing the fields of physical medicine and rehabilitation, orthopedic surgery, psychiatry and neurology, internal medicine, pediatrics, general surgery, and medical education. In addition, there are three members who are physical therapists, two nominated by the American Physical Therapy Association and one nominated by the American Registry of Physical Therapists. The senior educational consultant of the American Physical Therapy Association attends meetings as a consultant. Surveys of new and existing schools are conducted by joint physician-therapist teams and recommendatory action submitted by the advisory groups to the Council for action. Active liaison with the medical directors, therapist educational administrators, and other members of the teaching faculties in approved schools is being implemented through more frequent periodic surveys.

There are, at present, 37 approved schools. On the basis of data reported to the American Physical Therapy Association, enrollment statistics for the senior class of degree programs and for the certificate programs and the number of graduates for 1955 and 1956 were as follows:

Year and Class	No. of Schools Reporting	No. of Senior (Degree) and Certificate Students Enrolled	Total No. of Graduates
1955 Senior	24	742	634
1955 Certificate	27		
1956 Senior	25	800	701
1956 Certificate	28		

Certificate and/or degree recognitions in physical therapy are available and those so recognized have equal professional status. Most schools offer both degree and certificate programs and either or both recognitions are available depending upon a student's preparatory collegiate education. Certificate programs vary in length from 12 to 34 months. The courses are open to students with two or three years of college or those who have graduated from a nationally accredited school of professional nursing of at least three years' duration. The majority of degree programs are four years in length and admit qualified high school graduates and transfer students. Interested undergraduates are encouraged to contact the school of their choice early since admission and transfer requirements vary. Tuition varies in accord with university fees and the majority of courses begin in September and February. Lists of approved schools are available from the Council.

Application for approval should be made to the Council on Medical Education and Hospitals of the American Medical Association. Forms will be supplied for this purpose on request. They should be completed by the administrator of the institution requesting this approval. Inquiries regarding voluntary registration of qualified therapists should be addressed to the American Registry of Physical Therapists, 30 N. Michigan Ave., Chicago 2. Information on requirements for state registration or licensure is available from the Board of Examiners of the states concerned. Inquiries regarding careers

in the field of physical therapy should be addressed to the American Physical Therapy Association, 1790 Broadway, New York 19.

SCHOOLS FOR X-RAY TECHNICIANS

The Council has been ably assisted by the American College of Radiology, the American Registry of X-ray Technicians, and the American Society of X-ray Technicians in revising criteria for training and evaluating educational programs in x-ray technology. These advisory groups participated in the most recent revision of the standards adopted by the House of Delegates in December, 1955. Particularly encouraged is progressive training in radiation therapy to afford students at least one month's practical experience intramurally or through affiliation.

Schools making application for approval are surveyed by state and regional councilors appointed by the American College of Radiology. Radiologists appointed by the College also periodically resurvey approved schools and these radiologists are currently revisiting approved schools. Their tremendous and voluntary contribution of time and experience are a major asset in the program. All data are evaluated by the Advisory Committee to the American Society of X-ray Technicians of the American College of Radiology and recommendations submitted to the Council for final action.

At present there are 517 schools approved by the Council for training x-ray technicians, which represents an increase of 13% over the 456 approved as of Sept. 22, 1956. Enrollment for 1956 increased 297, or 10%, to a total of 3,212 students. The training capacity increased 12% in 1956 over 1955 to a total of 3,974. Similarly, the number of graduates increased 8% to a total of 1,966 in 1956.

The minimum admission requirement is high school graduation. A total of 493 schools (almost 96%) admit students directly out of high school, 17 schools (3%) require one year of college, 6 schools (1%) require two years of college, and one school accepts only registered nurses.

The length of training in 285 (55%) is 24 months, 12 months in 152 (29%), 18 months in 55 (11%) and varies from 13, 14, 15, 36, and 48 months in the remaining 5% of approved schools. Tuition is required by 188 (36%) and 66% pay students a stipend. Collegiate affiliations have been established by 182 (35%) of approved schools. College credit is granted for training satisfactorily completed in the hospital training program in 11%, or 65 schools. Students should apply directly to the radiologist-director of an approved school. Lists are available from the Council on request.

Applications for approval of schools of x-ray technology should be submitted to the Council on Medical Education and Hospitals of the American Medical Association, 535 N. Dearborn St., Chicago 10. Inquiries regarding registration of qualified x-ray technicians should be addressed to the American Registry of X-Ray Technicians, Metropolitan Building, Minneapolis 1.

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MEDICAL EDUCATION FOR NATIONAL DEFENSE

MEDICAL Education for National Defense (MEND) is a program for introducing into the regular medical school curriculum information about the special problems of military and disaster medicine. Started in 1952 with five pilot schools, it has been steadily expanded each year and now includes 45 schools with an enrollment of more than 14,000 medical students. It has had far more enthusiastic reception in the medical schools than one might have expected, and each year there have been more schools seeking to be included than funds would permit.

The reasons for the success of the program are easily identified:

1. Seventy to eighty per cent of all recent medical graduates are serving on active duty with the military establishment and are giving most of the professional care to the members of the armed forces. Thus, there is real need for continuing close liaison between the medical schools and the military.

2. The armed forces and the U. S. Public Health Service groups who have sponsored symposiums have had valuable information to transmit to the members of the medical school faculties.

3. The schools have been permitted to have this material integrated into the curriculum by the faculty in whatever manner is best suited to the needs of their particular school.

4. The faculties have responded well to the challenge posed by the increasing responsibility that is theirs for preparing medical students to meet the special problems of defense medicine, both in and out of military service.

The cost of the program has been most reasonable, averaging $10,000 per school per year, or about $30 per student. Last year the total cost including the operation of a coordinator's office in Washington was $325,000 for 35 schools. The benefits are not identifiable in terms of military recruitment or better understanding by the student of technical military procedures. Rather, the benefits include better understanding by the student of the special kinds of medical problems encountered in military situations, a better attitude toward military service, and an informed medical faculty who can disseminate far more effectively than the military the results of the extensive medical research program of the military. The benefits of such a program in the event of a sudden attack with extensive civilian casualties are difficult to overestimate.

The economy wave has hit the military establishment hard enough to wash out about 40% of the funds anticipated for the MEND program for this year. A second wave next year could eliminate it completely. It is difficult to see how a more economical program could be devised to meet what is surely a real need. False economy can be costly, not only because it may be necessary to spend more at a later time to do the same job but because valuable time may be lost which no amount of money can buy. In the event of sudden attack on our country, the lives of many people may depend upon the degree of preparation of physicians in this special field of defense medicine.

The MEND program has had the full backing of the Trustees of the American Medical Association, the Council on Medical Education and Hospitals, the Association of American Medical Colleges, and many outstanding individuals. It has demonstrated that it can do a job that needs doing. It has not spent large sums to entrench itself bureaucratically and stands only on its merit. It will be interesting to see how much support its merit will command among those who have responsibility for the always difficult task of budgetary retrenchment.

LIFE-LONG EDUCATION

Robert M. Hutchins epitomized the gap that exists between the whole sum of knowledge and that acquired by any person in a finite educational period when he said, "The college graduate is presented with a sheepskin to cover his intellectual nakedness." As the elements of newly discovered knowledge amass each year, even the most honored sheepskin soon becomes an inadequate garment. This is crucially true in medicine, affecting as it does the health care of everyone. The American medical profession is notable for recognizing clearly that the study of medicine is a life-long challenge to each doctor. The provision of suitable opportunities for continuing education is a challenge to medical edu-

cators in American medical schools which, with the hospitals and their staffs, constitute the personnel and facilities required for effective medical education.

The American Medical Association through its Council on Medical Education and Hospitals is concerned to an increasing degree with postgraduate medical education so that through concerted attention and efforts by all involved the needs of the profession will be met better and more fully. Application to this phase of medical education of the experiences gained from improvements in undergraduate and graduate medical education should be mutually beneficial to the profession and to educators.

The report on medical education in this issue of THE JOURNAL includes the results of studies of postgraduate courses held in the 1956-1957 year. Attention is confined to formal postgraduate courses in the analysis in order to develop more basic information than would be possible if all of the various kinds of activities that might be labeled educational were considered together. Emphasis has been placed on some of the more qualitative factors in addition to the numbers of courses and of enrollments. The studies indicate an encouraging improvement in the facilities and education methods utilized in postgraduate courses during the past year as compared with the previous year. Improvements in the quality of postgraduate courses each year together with increases in the number of meritorious courses should result in more doctors regularly availing themselves of such educational opportunities.

The annual list of postgraduate courses for physicians for the current year that began Sept. 1, 1957, was published in the Aug. 17 issue of THE JOURNAL (pages 1773-1825).

COSTS OF MEDICAL SCHOOL ACTIVITIES

Much has been said and written regarding the high costs of medical education. Most often the expenses of supporting the complex activities of a medical school and its faculty are interpreted as reflecting solely the cost of educating medical students. There is very little awareness on the part of the general public and incomplete awareness by the profession itself that many of the expensive undertakings of medical schools are not directed solely and often not primarily to undergraduate medical students.

In its report on Medical Education in the United States and Canada, the Council on Medical Education and Hospitals refers to medical school cost accounting studies initiated at the State University of New York and Emory University. In both instances, the studies relate medical school expenditures to the functions supported by the expenditures. Funds expended have been assigned on the basis of careful cost analysis to such functions as undergraduate, graduate, and postgraduate medical instruction; the instruction of nonmedical students; research; and patient and community services. Medical school finances present a continuing source of major concern and an increasing problem to everyone involved in medical education. Acquisition of as complete knowledge as possible of the purposes for which funds are expended would seem to be fundamental to any effort for designing the necessary financial stability of medicine's educational facilities.

Without identification of money spent with the function served, it cannot be possible for university and medical school administrators to allocate most effectively the funds available. There should be a directed reasonable relationship between the order of importance of objectives assumed and sums assigned in support of those objectives. The general public is at one time both the ultimate source of medical school funds and the ultimate benefactor of the activities those funds support. Better knowledge of how medical school dollars are spent rather than merely where they are spent should make everyone more responsive to medical school needs.

It should not be impossible for medical schools to develop and accept a uniform system of cost accounting. Such a system, if used with intelligent caution, could be of great value. As stated in the report of the study of the State University of New York, medical colleges could "learn not only how other medical colleges spend money, but how they save it".

CONVENTION DRUG SAMPLES

Just prior to the American Medical Association 1957 Annual Meeting, THE JOURNAL (May 25, 1957, page 418) discussed the supplying of professional drug samples to physicians attending medical conventions. In general, the greatest hazard seems to be having potent drugs fall into wrong or unauthorized hands. The Medical Exhibitor's Association, as much concerned with potential dangers to the public health as are the medical profession and the Food and Drug Administration, proposed its own "no sampling" procedure. Pharmaceutical companies could, at their own option, have used the official placard which stated:

> WELCOME DOCTOR
> For your convenience, samples and literature
> will be delivered to your home or office
> as you request.

After the New York meeting, a questionnaire was mailed to every physician who registered, and one bit of information solicited was a personal opinion concerning the distribution policy on samples and literature. On the basis of the more than 8,000 answers that have been received and tabulated, well over half the replying doctors favored samples be-

ing sent on request, rather than having free distribution at booths. In fact, only 3 out of every 10 physicians answering wanted convention drug distribution. In contrast, a majority of physicians did want literature available at the exhibition booths.

Interestingly enough, these same doctors were asked why they came to the convention, and the objective of seeing the technical displays ranked a close second to hearing the papers and seeing the scientific exhibits.

It would seem that the majority of physicians, as well as the pharmaceutical exhibitors themselves, prefer that professional drug samples be distributed on a specific request basis. At the same time, however, the doctors desire the convention to have detailed literature available on all phases of a drug's pharmacology, and, in addition, they seek the opportunity to discuss a manufacturer's product with the company's professional representative. Adherence to such a convention drug sample program, while strictly voluntary, could result in a twofold accomplishment. First, unfortunate incidents of prescription-only drugs being indiscriminately available (either to a visitor at the convention, or by the doctor discarding his collection in his hotel before returning home) could be avoided. Second, and of more significance, a greater opportunity would be provided for the practitioner to secure sufficient data concerning a drug to know all of a drug's action, and reaction, before administration. There is mutual agreement between pharmaceutical houses and the medical profession that the doctor must satisfy himself as to a product's need and worth, rather than just rely on advertising.

LOOKING AHEAD

At the present time there are 78 approved four-year medical schools, 4 two-year schools of basic medical science, and 4 new four-year medical schools in various stages of development in the United States. By 1960 or 1961, if current developments proceed on schedule, there will be 83 four-year medical schools and 3 two-year schools of basic medical science in operation. Providing current enrollment trends are maintained, these institutions will by that time enroll somewhat over 30,000 medical students and graduate between 7,300 and 7,500 physicians annually. Currently several other medical school developments are under consideration but, at the moment, none have materialized to the point of definitive planning or action.

Up to the present time educational and service facilities in medicine have developed largely in response to local and state needs and desires. Fortunately, the facilities that have arisen in this fashion have kept pace, in general, with the immediate service demands of the public and the educational desires of well qualified students seeking medical careers. During recent years, however, significant events have occurred with resultant impacts on medical education and medical care which indicate the potential need for increased medical personnel as well as the faculty, facilities, and financing essential to their education and training.

Population estimates for the future indicate numbers in excess of those forecast by the most reliable population experts of a few decades ago. There has been a steadily increasing percentage of college-age youth entering institutions of higher education. Projections into the "sixties" indicate that colleges and universities face a deluge which will present challenges to every facet of our educational system. It is recognized that utilization of physician-population ratios as an index of physician needs is replete with fallacies. Modern transportation, improved means of communication, new diagnostic techniques and markedly more effective therapeutic approaches have created a world for the physician of today so different from the point of view of efficiency and effectiveness that unqualified statistical comparison of physician-population ratios with earlier years is relatively meaningless. The rising population tide, however, will inevitably witness the demand for augmented medical personnel.

The development of certain areas of specialization such as anesthesiology, radiology, and pathology, although laudable and desirable, removes increasing numbers of physicians from practice or the routine care of patients in the ordinary sense. Increasing numbers of physicians are being drawn into such fields as medical administration, industrial medicine and full-time research. The nature of medical practice itself changes as the population grows older and a relatively greater proportion of people reach the upper age brackets where increased needs for medical care arise. The very nature of entire specialty fields such as syphilology, urology, and otolaryngology has been altered significantly in a brief period of time through the development of new therapeutic weapons.

Thus the question as to "How many doctors are enough" is an increasingly complex question to answer in this rapidly changing scene. Nevertheless, American medicine faces the challenge of assuming a role of leadership in studying the current situations, evaluating current assets in medical education and their potentialities, and making every reasonable effort to forecast objectively as to the possible needs that lie ahead. Furthermore, these studies should be broad gauge and include objective evaluations of all the factors impinging on medical care today which carry implications as to future trends and needs in medical education. It is only through such an approach that it will be possible to maintain the role of leadership which American medicine should play in the stimulation, encouragement, and development of the educational facilities needed in this field in the years ahead.

MEDICAL NEWS

CALIFORNIA

Personal.—Dr. Malcolm H. Merrill, of Berkeley, director of the California Department of Public Health, has been appointed to the National Advisory Health Council, Surgeon General Burney of the Public Health Service has announced.

Conference on Cardiovascular Physiology.—A weekend conference on cardiovascular physiology as applied to clinical practice will be held in the Herbst Auditorium, Mt. Zion Hospital, San Francisco, Dec. 13-15. Presented by the visiting staff of the hospital, in cooperation with the University of California Medical Extension, the conference will present a broad survey of the present concepts of the dynamics of circulation as exhibited in cardiovascular disease. Emphasis will be placed on the need for understanding basic physiologic and biochemical disturbances for the successful diagnosis and management of cardiovascular disease. Dr. Lewis Dexter, assistant professor in medicine, Harvard Medical School, Boston, will be guest speaker. Dr. John J. Sampson, clinical professor of medicine, University of California School of Medicine, will serve as program chairman. Information and registration forms may be obtained by writing Dr. Seymour M. Farber, Head of Medical Extension, University of California Medical Center, San Francisco 22.

Dr. Loosli Appointed Dean.—The appointment of Dr. Clayton G. Loosli, professor of medicine and chief of the section of preventive medicine, University of Chicago, as dean of the University of Southern California School of Medicine, Los Angeles, has been announced. Winner of the Commonwealth Fund Senior Award for Support of Creative Research this year, Dr. Loosli will assume his duties as dean by July of next year. He succeeds Dr. Gordon E. Goodhart, who resigned as dean in March, 1956, to enter the private practice of psychiatry. Since that date, the School of Medicine has been directed by an Interim Administrative Committee under the chairmanship of Dr. Thomas H. Brem. Dr. Loosli is a consultant to the Communicable Disease Center of the U. S. Public Health Service, as well as a member of the Commission on Influenza and the Central Committee of the Armed Forces Epidemiological Board, Office of the Surgeon General (Army). He is a member of the Committee on Naval Medical Research and the Medical Fellowship Board of the National Academy of Sciences–National Research Council. He also serves on the Test Committee in Medicine, National Board of Medical Examiners; the Scientific Advisory Committee of the Common Cold Foundation; and the Advisory Committee on Research on Lung Cancer, American Cancer Society.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

ILLINOIS

Dr. Baldwin Honored.—Dr. Arthur K. Baldwin, of Carrollton, was selected by the Illinois State Medical Society as "General Practitioner for 1958." A plaque emblematical of the honor as "family doctor" for the year will be presented to Dr. Baldwin at the society's annual meeting in Chicago next May. The selection was made "on the basis of Dr. Baldwin's 35 years as a country physician, his service to the medical profession, his war record and his community activities." Dr. Baldwin has been president of the Tuberculosis Sanatorium Board since its founding 10 years ago, and became charter president of the Lions Club in 1936.

INDIANA

Personal.—Dr. Clayton G. Weigand has been named director of the new medical administration division of Eli Lilly and Company, Indianapolis, and Dr. Sholom O. Waife has been appointed head of the medical editorial department.

State Medical Election.—The following officers of the Indiana State Medical Association have been elected: Dr. Kenneth L. Olson, South Bend, president-elect; Dr. Okla W. Sicks, Indianapolis, treasurer; and Dr. Richard P. Good, assistant treasurer. Dr. Malachi C. Topping was installed as president.

MAINE

Personal.—A special award by Colby Junior College, New London, N. H., was presented to Dr. Paul F. Russell, of North Edgecomb, for 34 years a malaria research expert with the Rockefeller Foundation, "in recognition of distinguished services which have contributed to the common good." The citation presented to Dr. Russell read in part, "For his leadership in combatting the disease of malaria and eliminating this scourge from many areas of the world. Dr. Russell has contributed to fundamental knowledge of malaria and has developed practical control measures suited to the rural tropics . . ."

MARYLAND

Personal.—Dr. Morris M. Cohen who has been associated with the Baltimore City Health Department Venereal Disease Bureau since 1948, has been appointed clinical director for the Division of Venereal Diseases.——Robert D. Coghill, Ph.D., director of research of Abbott Laboratories, North Chicago, Ill., has been appointed special assistant for industrial research at the Cancer Chemotherapy National Service Center, National Cancer Institute, Bethesda. In this position Dr. Coghill will be responsible for the industrial aspects of the national program of cancer chemotherapy research.

Physicians Meeting in Baltimore.—The Maryland–District of Columbia regional meeting of the American College of Physicians will be held Nov. 16 at the Chemical Hall, University of Maryland School of Medicine, Baltimore. Fifteen papers are scheduled for presentation at the morning and afternoon sessions. Dr. Maurice C. Pincoffs, past-president of the college, will present "Trends in Internal Medicine" following the luncheon meeting. Special guests include Dr. Ward W. Briggs, Dr. Leroy E. Burney, Dr. Lewis B. Flinn, General Silas B. Hays, M. C., U. S. Army; Admiral Bartholomew W. Hogan, M. C., U. S. Navy; Mr. Edward R. Loveland; Dr. Lemuel C. McGee; Dr. William S. Middleton; General Dan C. Ogle, M. C., U. S. Air Force; Dr. William S. Stone; Dr. Thomas B. Turner; Dr. W. Barry Wood Jr.; and Dr. Wallace M. Yater. Interested physicians, residents, and interns are invited. For information write The American College of Physicians, 4200 Pine St., Philadelphia 4.

MASSACHUSETTS

Personal.—Dr. Richard B. Cattell is recipient of the 1957 honor award given by the American Medical Writers' Association. Dr. Cattell is director, Lahey Clinic, and surgeon-in-chief, New England Baptist Hospital. The award, a plaque and gold medal, is given periodically to individuals "who have made distinguished contributions in writing, editing, publishing, or other means of communication in medicine."——Dr. Edwin L. Crosby, director, American Hospital Association, delivered the Charles F. Wilinsky Lecture for 1957 of the Harvard University School of Public Health recently on "The Hospital, Health Center of the Community."

Dr. C. A. Smith Receives Arvo Ylppö Medal.—The first Arvo Ylppö medal, honoring the founder of the modern practice of pediatrics in Finland, was awarded in Helsinki Oct. 26 to Dr. Clement A. Smith, associate professor of pediatrics, Boston Lying-In Hospital, The Children's Hospital, and Harvard Medical School, Boston. The occasion marked the 70th birthday of Dr. Ylppö, who is professor of pediatrics at Helsinki University. Dr. Smith was selected to receive the first gold medal for his basic research in the care of premature infants. Dr. Ylppö also received a gold medal in the ceremonies. The Arvo Ylppö Medal henceforth will be awarded every fifth year to both a Finnish and a foreign scientist, whose contributions must be international in importance and specialize in research dealing with prematurity. Subsequent medals will be struck in silver. The award has been established by four Finnish organizations: The Mannerheim League for Child Welfare; The Finnish Pediatric Association comprised of physicians specializing in pediatrics; the Foundation for Support of Pediatric Research; and the Orion Company, manufacturers of pharmaceuticals. Prior to receiving the Arvo Ylppö award, Dr. Smith, for three weeks, was visiting professor of pediatrics at the Medical School of the University of St. Andrews, Dundee, Scotland.

MINNESOTA

Establish Comfort Lectureship.—A lectureship in gastroenterology honoring Dr. Mandred W. Comfort has been established, the Mayo Association has announced. The project, which may include guest lectureships, visiting professorships, or other phases of graduate medical education, will be supported by a fund provided by Mrs. Comfort. To this fund will be added other sums from friends, former patients, and associates who ask that their gifts be devoted to a suitable memorial to the late physician, educator, scientist, and board member, "to advancement of the field of medicine to which he gave his professional life." The fund will be used under auspices of the Mayo Foundation for Medical Education and Research.

Personal.—The 10th annual Dr. Julius Friedenwald Memorial Lecture was delivered at the University of Maryland School of Medicine, Baltimore, Oct. 17 by Dr. Waltman Walters, of the department of surgery, Mayo Clinic, Rochester, Minn., on "Thirty Years Experience in the Treatment of Biliary Tract Lesions."——Dr. John B. Redford, Mayo Clinic, Rochester, received an award from the American Congress of Physical Medicine and Rehabilitation at its annual meeting in Los Angeles for his contribution on "The Effects of Breathing Exercises on Pulmonary Emphysema."——Dr. Walter A. Fansler, Minneapolis, director, department of proctology, University of Minnesota, has been chosen "Man of the Year" by the Phi Beta Pi National Medical Fraternity. Each year this organization selects one of its members for this honor. Dr. Fansler is a founder and past-president of the American Board of Proctology. ——Dr. Charles Sheard, former head of the Section of Biophysics and Biophysical Research in the Mayo Clinic and Mayo Foundation, Rochester, received the Tillyer Medal of the Optical Society of America

at its annual dinner Oct. 18.—Dr. Benjamin A. Weis has been elected president of the Charles T. Miller Hospital, St. Paul, succeeding Dr. Wallace P. Ritchie.

MISSISSIPPI

Society News.—The Mississippi Academy of General Practice has installed the following officers: Dr. John C. Longest, president; Dr. Addison T. Tatum, Petal, president-elect; Dr. Louis F. Rittelmeyer, Jackson, vice-president; and Dr. R. J. Moorhead, Yazoo City, secretary-treasurer.

Personal.—Dr. Arthur C. Guyton, chairman, department of physiology and biophysics, University of Mississippi Medical Center, delivered the annual William H. Vogt Lectureship sponsored by the Alpha Mu Chapter of Alpha Kappa Kappa of the Saint Louis University School of Medicine, Oct. 24, on "The Application of Basic Physical Principles to Medical Research."

NEW JERSEY

Beling Memorial Lecture.—Dr. Paul Victor Lemkau, Sc. D. (Hon.), professor, public health administration, division of mental hygiene, The Johns Hopkins University School of Hygiene and Public Health, Baltimore, will give the 11th annual C. C. Beling Memorial Lecture at the East Orange Veterans Administration Auditorium Nov. 20th under the auspices of the New Jersey Neuropsychiatric Association. The topic is "The Role of Psychiatry in Public Health Philosophy."

NEW YORK

Personal.—An honorary doctor of laws degree has been conferred on Dr. Herman E. Hilleboe, State Health Commissioner, during special ceremonies inaugurating the Institute of Health, Education, and Welfare at Adelphi College, Garden City, L. I. Dr. Hilleboe is chairman of the Joint Hospital Survey and Planning Commission, and the State Water Pollution and Air Pollution Control Boards; director of the American Heart Association; and trustee of the Nutrition Foundation.

New York City

Grant for Hospital Construction.—A $100,000 gift from the Lillia Babbitt Hyde Foundation has been made to New York University–Bellevue Medical Center. The gift will go toward the construction of a 19-story, 600-bed general hospital to replace the University Hospital located at 20th Street and Second Avenue. The new hospital will be on the Medical Center campus, and construction is due to begin in January, 1959. Gifts now totaling more than $400,000 have been received from the foundation since the Medical Center was formed in 1948. These contributions have gone toward research, fellowships, and equipment for New York University Post-Graduate Medical School, the New York Skin and Cancer Unit, and University Hospital, all of which are a part of University–Bellevue Medical Center. The $100,000 gift will go toward the five million dollar-for-dollar matching gift from the Samuel H. Kress Foundation which was announced last March at the opening of the campaign for a new hospital.

NORTH CAROLINA

Grants for Medical Research Facilities.—Duke University, Durham, has received two U. S. Public Health Service grants totaling $84,000 to expand and improve research laboratory facilities at the University's Medical Center. One grant of $42,000 will be used to expand the center's tissue culture laboratory for study of tumor-producing viruses. The other grant, also $42,000, will provide for the equipping of a new laboratory for physiological studies of pathogenic fungi. Both laboratories will be housed in the Bell Medical Research Building near Duke Hospital and are expected to be ready for use next spring. The expanded and improved tumor virus laboratory will occupy existing space in Bell Building. Present facilities for tumor virus research are housed in another part of the building.

OHIO

Society News.—The Mont Reid Surgical Society held its Third Triennial Home Meeting at the Cincinnati General Hospital, Oct. 11-12. Dr. Harvey Stone of Baltimore was the guest speaker at the annual banquet. New officers elected were as follows: Dr. Max M. Zinninger, president; Dr. Vinton E. Siler, president-elect; and Dr. James A. Helmsworth, secretary-treasurer.

PENNSYLVANIA

Dr. Chapman Honored.—Dr. Leroy E. Chapman, who is state senator and past-president of the Association of Physicians and Surgeons, Pennsylvania Railroad, has been awarded the decoration of the National Order "Carlos Finlay" by the President of the Republic of Cuba, Major General Fulgencio Batista y Zaldivar, "in recognition of . . . valuable assistance at the exercises held in commemoration of the One Hundredth Anniversary of the graduation of . . . Dr. Finlay from Jefferson Medical College in Philadelphia." The presentation was made in a ceremony at the Cuban Embassy Oct. 14 by Miguel Angel Campa, Ambassador of Cuba.

Philadelphia

Personal.—The appointment of Dr. Robert M. Bucher as associate dean of Temple University School of Medicine has been announced. Dr. Bucher, who is assistant professor of surgery at the university, was awarded the Master of Science de-

gree in Surgery by the university in 1950 and was appointed to the faculty as instructor. He was subsequently appointed associate in 1956 and to assistant professor early this year. He is a fellow of the American College of Surgeons and a diplomate of the American Board of Surgery.

TEXAS

Personal.—Col. John W. Simpson, M. C., U. S. Army, chief of the obstetrics and gynecology service at Brooke Army Hospital, who retired from active military service Sept. 30, will become medical director of the Bexar County Hospital District.

Society News.—The Bexar County Medical Society attended a dinner meeting at the School of Aviation Medicine at Randolph Air Force Base, Oct. 22. The topic for discussion was the effects of diet on heart disease. The visiting speaker was Dr. Frederick J. Stare, head, department of nutrition, Harvard University Medical School, Boston. Col. Lawrence J. Milch, head, department of biochemistry, School of Aviation Medicine, discussed serum lipoproteins, the atherogenic index, and coronary artery disease; Dr. Lawrence E. Lamb, head, department of internal medicine, School of Aviation Medicine, "The Clinician and the Coronary Panic"; Dr. William F. Taylor, head, department of biometrics, "Statistical Reasoning Applied to Recent Work on the Causes of Atherosclerosis." Maj. Gen. Otis O. Benson Jr., commandant of the school, was host to the medical society. The program chairman was Lt. Col. Joseph M. Quashnock, head of the department of aviation medicine.

WISCONSIN

University News.—Dr. Walter Artelt, director of the Institute for the History of Medicine at University of Frankfurt on the Main, Germany, will join the University of Wisconsin Medical School faculty in February, 1958. Professor Artelt will teach History of Medicine as visiting professor in the Medical School.

Symposium on Radioisotopes.—The Milwaukee Academy of Medicine will present a symposium on radioisotopes at the Marquette University Brooks Memorial Union, Dec. 7. Object of the symposium, which will be moderated by Dr. Austin M. Brues, director, biology division, Argonne National Laboratory, is to present a discussion of radioisotopes—fundamental information with medical orientation. Discussion topics include the following:

Basic cellular and histologic changes produced by radiation energy, Dr. William Bloom, professor of anatomy, University of Chicago.

Radioisotope chemistry, Dr. Edward A. Doisy, Jr., associate professor of internal medicine, St. Louis University School of Medicine.

Basic nuclear physics and instruments, Titus C. Evans, Ph.D., professor of radiation research, State University of Iowa College of Medicine.

Radioisotope pharmacology, Dr. Eugene M. K. Geiling, professor of pharmacology, University of Chicago.

Basic radiation biology, Harvey M. Patt, Ph.D., senior physiologist, Argonne National Laboratory.

Radioisotope physiology, Dr. Joseph F. Ross, professor of medicine and associate dean, University of California School of Medicine, San Francisco.

Physicians are welcome; there is no registration fee. For information write the Milwaukee Academy of Medicine, 561 North 15th St., Milwaukee 3, Wis.

GENERAL

Western Surgical Meeting.—The 65th annual meeting of the Western Surgical Association will be held Nov. 21-23 at the Hotel Utah, Salt Lake City. Thirty-six papers are scheduled for presentation. A preliminary conference session includes the following topics and speakers:

Right Atrial Pressure as an Index of Blood Volume Change, Drs. Russell M. Nelson and John Gary Maxwell.

Genetic Aspects of Intestinal Polyps, Dr. Ralph C. Richards.

Pyrogenic Contamination of Parenteral Solutions, Dr. Stanley Marcus.

The Vomiting Center, Dr. Petter Lindstrom.

Splenectomy: Indications, Complications, Results, Dr. George Cartwright.

Bacterial Invasion in Burn Wounds, Dr. Philip B. Price.

Dysfunctional Uterine Bleeding, Dr. Emil Holmstrom.

Influence of Steroid Hormones on Inflammation, Dr. Thomas Dougherty.

The president's address, "The Past, Present, and Future of the Western Surgical Association," will be given Nov. 22 by Dr. Everett P. Coleman, Canton, Ill. The annual dinner will be held Nov. 22. Entertainment includes an organ recital at the Mormon Tabernacle and a tour of Big Cottonwood Canyon. A special ladies' program is arranged. For information write The Western Surgical Association, Dr. John T. Reynolds, Secretary, 612 North Michigan Ave., Chicago 11.

Essay Contest for Original Research.—The American Society of Maxillofacial Surgeons announces an essay contest for papers based on some original research (either clinical or experimental) in maxillofacial surgery. Any medical graduate may enter the contest. The essays shall be based on work not previously published even in part, and shall be submitted in triplicate, in English only, and not more than 4,000 words in length. Manuscripts will not be accepted by the Award Committee after April 1, 1958, and should be sent by registered mail. Certificates will be given to the authors of the first and second prize essays. The winners of these certificates will receive $300 and $200, respectively, for traveling expenses. The two winning papers are to be read by the authors before the annual convention of the American Society of Maxillofacial Surgeons, May 11-15, 1958, in Boston.

Information may be obtained from the secretary of the society, Dr. Orion H. Stuteville, 700 N. Michigan Ave., Chicago 11.

Chest Physicians Meet in Philadelphia.—An interim session of the American College of Chest Physicians will be held Dec. 2-3 at the Warwick Hotel, Philadelphia. The program includes 10 papers followed by open discussions. Two panel discussions are planned: "The Management of Pulmonary Emphysema," moderated by Dr. R. Drew Miller, instructor in medicine, University of Minnesota Graduate Medical School, Rochester, and "The Evaluation of Cardiac Disability," moderated by Dr. Coleman B. Rabin, assistant clinical professor of medicine, Columbia University College of Physicians and Surgeons, New York City. The following four round-table luncheons are scheduled: present and future developments in heart surgery, long-term results of chemotherapy in tuberculosis, anticoagulant therapy in acute and chronic coronary heart disease, and inhalation therapy. Fourteen fireside conferences will be held. Guest speaker at the annual dinner will be Mr. Robert K. Bell, Ocean City, N. J., who will speak on "The Challenge to the Medical and Legal Professions." For information write the American College of Chest Physicians, 112 Chestnut St., Chicago 11.

Fellowship in Medical Neoplasia.—The Memorial Center for Cancer and Allied Diseases, New York City, announces a special fellowship in medical neoplasia. Purpose of the fellowship is (1) to offer the physician trained in internal medicine the opportunities available at Memorial Center to study the natural history, diagnosis, complications, pathogenesis and pathologic physiology, pathology, and treatment of cancer, with particular emphasis on the leukemias, lymphomas, and allied diseases, and (2) to undertake an active supervised clinical investigation of interest to the service and the fellow in the field of medical neoplasia (nonsurgical cancer and palliative therapy of patients with malignant tumors). The study is to be carried out at Memorial Center under the aegis of the Medical Neoplasia Service of the Department of Medicine. Candidates must be graduates of recognized A. M. A. approved medical schools, and must have completed or be in process of completing two years of postgraduate training in internal medicine in addition to one year of internship. Such training may be formal residency or its equivalent. The salary stipend is $6000 per annum without maintenance. The appointment is for one year normally beginning July 1, renewable for one or two years for individuals who develop special interest in some problem. Applicants should apply in writing to Dr. Lloyd F. Craver, Chief, Medical Neoplasia Service, Memorial Center for Cancer and Allied Diseases, 444 E. 68th St., New York 21.

EXAMINATIONS AND LICENSURE

MEDICAL SPECIALTY BOARDS

AMERICAN BOARD OF DERMATOLOGY: *Written.* Several Cities, June 30. *Oral.* Detroit, Oct. 17-19. Final date for filing all applications is April 1. Sec., Dr. Beatrice Maher Kesten, One Haven Ave., New York 32.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written.* Oct. 20, 1958. *Oral.* New Orleans, Feb. 4-7; Philadelphia, April 23-26; San Francisco, June 18-21; Chicago, Oct. 13-16. Exec. Sec.-Treas., Dr. William A. Werrell, One West Main St., Madison 3, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: Examination given twice annually, in the spring and fall. In order to be eligible a candidate must have his application filed at least six months before the examination time. Sec., Dr. Leonard T. Furlow, Washington University School of Medicine, St. Louis 10.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY. Various locations in the United States and Canada. *Part I.* Jan. 2. *Part II.* Chicago, May 7-17. Final date for filing application was September 1. Sec., Dr. Robert L. Faulkner, 2105 Adelbert Road, Cleveland 6.

AMERICAN BOARD OF OPHTHALMOLOGY: *Written.* January 1958. Final date for filing application was July 1. Secy., Dr. Merrill J. King, Box 236, Cape Cottage Branch, Portland 9, Maine.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Part I.* April 3-4, Rochester, Minnesota, Denver, Colorado, Washington, D. C. Final date for filing application is Nov. 30. *Part II.* New York City, Jan. 29-31, 1958. Sec., Dr. Sam W. Banks, 116 South Michigan Avenue, Chicago 3.

AMERICAN BOARD OF OTOLARYNGOLOGY: *Oral.* Chicago, Oct. 6-10. Final date for filing application is March. Sec., Dr. Dean M. Lierle, University Hospitals, Iowa City.

AMERICAN BOARD OF PATHOLOGY: *Oral and Written.* San Francisco, June 30-July 2. Sec., Dr. Edward B. Smith, Indiana University Medical Center, 1042-1232 W. Michigan St., Indianapolis 7.

AMERICAN BOARD OF PHYSICAL MEDICINE AND REHABILITATION: *Oral and Written.* Peoria, Ill., June 20-21. Final date for filing application is Feb. 1. Sec., Dr. Earl C. Elkins, 200 First St., S. W., Rochester, Minn.

AMERICAN BOARD OF PROCTOLOGY: *Oral and Written, Parts I and II.* September 1958. Final date for filing application is March 15. Sec., Dr. Stuart T. Ross, 520 Franklin Ave., Garden City, N. Y.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: *Oral.* San Francisco, March 17-18. Final date for filing application is Dec. 17. Sec., Dr. David A. Boyd, Jr., 102-110 2nd Ave., S. W., Rochester, Minn.

AMERICAN BOARD OF RADIOLOGY: Chicago, May 20-24. Final date for filing application is Jan. 1. Sec., Dr. H. Dabney Kerr, Kahler Hotel Bldg., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Part II.* Indianapolis, Nov. 18-19; Cincinnati, Dec. 16-17; New Orleans, Jan. 13-14; Durham, N. Car., Feb. 10-11; Baltimore, March 10-11; Chicago, May 12-13; Los Angeles, June 16-17 and Portland, Oregon, June 20-21. Sec., Dr. John B. Flick, 225 So. 15th St., Philadelphia 2.

BOARD OF THORACIC SURGERY: *Written.* Various centers throughout the country, February 1958. Final date for filing application is December 1. Sec., Dr. William M. Tuttle, 1151 Taylor Avenue, Detroit 2, Mich.

AMERICAN BOARD OF UROLOGY: *Written examination.* Various cities throughout the country. *Pathology and Oral Clinical.* February 1958. Location not decided. Exec. Secretary, Mrs. Ruby L. Griggs, 30 Westwood Road, Minneapolis 16.

DEATHS

Ferris, Eugene Beverly ⊕ New York City; born in McNeill, Miss., June 24, 1905; University of Virginia Department of Medicine, Charlottesville, 1930; from 1946 to 1952 he was successively instructor, assistant professor, associate and full professor at the University of Cincinnati College of Medicine, where he was also director of the Commonwealth Fund Psychosomatic Teaching Project; served as a member of the directing staff, Cincinnati General and Holmes hospitals, and also of the visiting staff, Bethesda Hospital; formerly chairman, department of medicine, Emory University School of Medicine in Atlanta, where he was chief, medical service, Grady Memorial and Emory University hospitals and consultant and member, dean's committee, Veterans Administration Hospital; past-president, vice-president, and member of the council, American Society for Clinical Investigation; past-president, past-secretary, and member of the council of the American Psychosomatic Society; member of the Association of American Physicians, Central Society for Clinical Research, American Clinical and Climatological Association, Sigma Xi, Alpha Omega Alpha, and Phi Beta Pi; fellow of the American College of Physicians and was currently serving his second term as a member of the board of regents; fellow of the American Association for the Advancement of Science; consultant in mental health and member of the committee on research of the mental hygiene council, U. S. Public Health Service, from 1946 to 1951, and the following year became a member of the cardiovascular study section; in 1948 member of the medical teaching mission to Poland and Finland, sponsored by Unitarian Service Committee and the World Health Organization; director of the research project on aviation medicine for Office of Scientific Research and Development, from 1942 to 1945; member of the subcommittee on decompression sickness, National Research Council from 1942 to 1946; in 1936 received the John Horsley Memorial Prize, University of Virginia, Charlottesville; medical director and past-vice-president of the American Heart Association; editor of the *Cincinnati Journal of Medicine* from 1945 to 1947, and of the *Journal of Clinical Investigation* from 1947 to 1952, when he became a member of the editorial board; served as a member of the editorial board of the *Journal of Laboratory and Clinical Medicine;* died Sept. 26, aged 52, of a heart attack.

⊕ Indicates Member of the American Medical Association.

Ackemann, Harry William ⊕ Rockford, Ill.; Northwestern University Medical School, Chicago, 1909; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; past-president of the Illinois Radiological Society; associated with Rockford Memorial and Swedish American hospitals, where he was past-president of the staffs; on the staffs of the Deaconess Hospital in Freeport and the Highland Hospital in Belvidere; died Sept. 18, aged 72, of carcinoma of the rectum.

Gambee, Louis Phaon ⊕ Portland, Ore.; Rush Medical College, Chicago, 1921; associate clinical professor of surgery at the University of Oregon Medical School; for many years member of the state public welfare commission; member of the founders group of the American Board of Surgery; fellow of the American College of Surgeons; past-president of the Pacific Coast Surgical Society and the North Pacific Surgical Society; formerly vice-president of the Oregon State Medical Society; on the staffs of St. Vincent's Hospital and the Providence Hospital, where he died Sept. 8, aged 65.

McNeill, Clyde ⊕ Louisville, Ky.; Johns Hopkins University School of Medicine, Baltimore, 1920; associate professor of radiology at the University of Louisville School of Medicine; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; veteran of World Wars I and II; consultant, Veterans Administration Hospital; associated with the Norton Memorial Infirmary and SS Mary and Elizabeth Hospital; author of "Roentgen Technique"; died Aug. 25, aged 63, of coronary disease.

Bickmore, Harold Vincent, Portland, Maine; Medical School of Maine, Portland, 1914; member of the Maine Medical Association; fellow of the American College of Physicians; specialist certified by the American Board of Internal Medicine; veteran of World War I; county physician; formerly member of the school committee; medical director of the Associated Hospital Service of Maine; on the staffs of the Maine Eye and Ear Infirmary and the Maine General Hospital; died in Cape Elizabeth Sept. 9, aged 68, of coronary disease.

Feher, Alexander, New York City; Medizinische Fakultät der Universität, Vienna, Austria, 1932; member of the American Academy of Ophthalmology and Otolaryngology; specialist certified by the American Board of Otolaryngology; assistant

professor of otorhinolaryngology at the New York University College of Medicine and the New York University Post-Graduate Medical School; on the staff of the Manhattan Eye, Ear and Throat Hospital; died Sept. 6, aged 48, of coronary thrombosis and arteriosclerosis.

Weissman, Max, New York City; Medizinische Fakultät der Universität, Vienna, Austria, 1921; member of the Medical Society of the State of New York; fellow of the American Psychiatric Association; specialist certified by the American Board of Psychiatry and Neurology; clinical associate professor of psychiatry at the State University of New York College of Medicine in Brooklyn, where he was on the staff of the Kings County Hospital; died in the Grace–New Haven Hospital in New Haven, Conn., Aug. 24, aged 62.

Block, William Henry, New Orleans; University of Maryland School of Medicine, Baltimore, 1895; an associate member of the American Medical Association and in 1922-1923 member of the House of Delegates; member of the Louisiana State Medical Society; veteran of the Spanish–American War; served as president of the Orleans Parish Medical Society; died in the Veterans Administration Center Hospital, Jackson, Aug. 28, aged 83, of bronchopneumonia.

Conolly, Joseph Bartholomew, Glen Cove, N. Y.; Long Island College Hospital, Brooklyn, 1909; member of the Medical Society of the State of New York; fellow of the American College of Surgeons; police surgeon; for many years medical inspector for the school system and health officer of Glen Cove; associated with Nassau County Tuberculosis Hospital in Farmingdale; died in St. Francis Hospital and Sanatorium for Cardiac Children, Roslyn, Sept. 13, aged 71.

Longshore, Walter Eugene Jr. ✙ Orange, N. J.; Howard University College of Medicine, Washington, D. C., 1934; specialist certified by the American Board of Radiology; member of the American College of Radiology; certified by the National Board of Medical Examiners; associated with the Martland Medical Center in Newark; courtesy staff member at New Jersey Orthopaedic Hospital and the Orange Memorial Hospital, where he died Aug. 26, aged 49, of a heart attack.

Peeler, Clarence N. ✙ Charlotte, N. C.; North Carolina Medical College, Davidson, 1906; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; past-president of the Mecklenberg County Medical Society; served on the faculty of his alma mater; for many years trustee, Wake Forest (N. C.) College; associated with Charlotte Eye, Ear and Throat Hospital and Charlotte Memorial Hospital, where he died Aug. 27, aged 78.

Strachauer, Arthur Clarence ✙ Minneapolis; born in Minneapolis May 1, 1884; University of Minnesota College of Medicine and Surgery, Minneapolis, 1908; member of the founders group of the American Board of Surgery; clinical professor emeritus of surgery at his alma mater; member of the Western Surgical Association and the American Association for the Surgery of Trauma; fellow of the American College of Surgeons; died in the Doctors Memorial Hospital Aug. 23, aged 73.

Baber, Kenneth P., Los Angeles; California Eclectic Medical College, Los Angeles, 1915; died Aug. 31, aged 71, of a heart attack.

Barksdale, Elisha ✙ Lynchburg, Va.; Medical College of Virginia, Richmond, 1904; fellow of the American College of Surgeons; associated with the Lynchburg General Hospital, Guggenheimer Memorial Hospital, and the Virginia Baptist Hospital, where he died Sept. 13, aged 76, of arteriosclerosis and cerebral thrombosis.

Baum, Albert, New York City; Medizinische Fakultät der Universität, Vienna, Austria, 1912; died July 30, aged 71, of cancer of the stomach.

Black, James Henry, Montgomery, Ala.; Medical College of Alabama, Mobile, 1905; died Aug. 30, aged 78, of heart disease.

Bobb, Edward Clyde ✙ Mitchell, S. D.; Northwestern University Medical School, Chicago, 1943; member of the American Academy of General Practice; associated with Methodist Hospital; died in Minneapolis Sept. 5, aged 44.

Breen, John ✙ Schroon Lake, N. Y.; Albany (N. Y.) Medical College, 1906; served as health officer of the towns of Schroon, North Hudson, and Minerva; past-president of the Essex County Medical Society; formerly county coroner; died Sept. 7, aged 78, of a heart attack.

Cahill, John Donald ✙ New York City; Georgetown University School of Medicine, Washington, D. C., 1932; fellow of the American College of Chest Physicians; associated with Seton, St. Joseph's, St. Elizabeths, Union, and Fordham hospitals, and Westchester Square Hospital, where he died Sept. 13, aged 50.

Carson, James, Calhoun, Ga.; (licensed in Georgia in 1934); died in the Gordon County Hospital, Sept. 10, aged 94.

Cowell, Katherine Rebecca Sherk ✙ Carlisle, Pa.; Woman's Medical College of Pennsylvania, Philadelphia, 1910; on the staff of the Carlisle Hospital, where she died Sept. 21, aged 69, of hypertensive cardio renal disease.

De Jarnette, Joseph S. ✙ Staunton, Va.; Medical College of Virginia, Richmond, 1888; member of the American Psychiatric Association; served as

superintendent of the Western State Hospital and as physician in charge of the De Jarnette State Sanatorium; died Sept. 3, aged 90, of arteriosclerosis.

Delehanty, Edward Thomas, Albany, N. Y.; Albany (N. Y.) Medical College, 1917; for many years county jail physician; on the staff of the Albany Hospital; died Sept. 4, aged 64, of arteriosclerosis.

Deming, Horatio S., West Palm Beach, Fla.; Bellevue Hospital Medical College, New York City, 1892; died in St. Mary's Hospital July 16, aged 87.

Doyle, Chauncey Jay, Grafton, Wis.; Marquette University School of Medicine, Milwaukee, 1925; service member of the American Medical Association; veteran of World War II; served as physician at the Veterans Administration regional office in Milwaukee; died in the Veterans Administration Hospital, Wood, Aug. 25, aged 59, hypertensive cardiovascular disease.

Enfield, Thomas Walter ⊕ Trenton, N. J.; Hahnemann Medical College of Philadelphia, 1923; died in Atlantic City Aug. 31, aged 60, of coronary occlusion.

Eppstein, Ralph Morris, Chicago; Chicago College of Medicine and Surgery, 1911; died Sept. 7, aged 76, of carcinoma of the rectum.

Fleck, Roland Friederick ⊕ Mahanoy City, Pa.; Jefferson Medical College of Philadelphia, 1920; veteran of World War I; since 1952 a medical examiner for commercial pilots under Civil Aeronautics Administration; associated with the Ashland (Pa.) State Hospital, Pottsville (Pa.) Hospital and Wills Eye Hospital in Philadelphia; died in Pocono Pines Aug. 25, aged 63, of coronary occlusion.

Genung, Mabel Amanda, Yarnell, Ariz.; College of Physicians and Surgeons, Los Angeles, 1911; died in the Good Samaritan Hospital, Phoenix, Aug. 27, aged 82.

Glasgow, Robert S. ⊕ Adamsville, Ala.; University of the South Medical Department, Sewanee, Tenn., 1900; died Aug. 17, aged 82, of acute coronary disease.

Glatfelter, Harvey Edward, Central City, Neb.; University of Maryland School of Medicine, Baltimore, 1891; also a dentist; died in the Hord Memorial Hospital Aug. 26, aged 88, of arteriosclerotic heart disease.

Guernsey, Paul Francis, Glendale, Calif.; Vanderbilt University School of Medicine, Nashville, Tenn., 1913; veteran of World Wars I and II; died Aug. 21, aged 69, of diabetes mellitus.

Hargens, Charles William, Hot Springs, S. D.; Northwestern University Medical School, Chicago, 1891; fellow of the American College of Surgeons; served on the staffs of Our Lady of Lourdes Hospital and Lutheran Hospital; died Aug. 23, aged 91, of carcinoma of the sigmoid.

Hayes, Henry Homer ⊕ Honolulu, Hawaii; Cooper Medical College, San Francisco, 1906; died in the Queen's Hospital Aug. 14, aged 76.

Healey, Thomas Vincent ⊕ Worcester, Mass.; Harvard Medical School, Boston, 1943; specialist certified by the American Board of Surgery; certified by the National Board of Medical Examiners; fellow of the American College of Surgeons; on the staffs of the Belmont Hospital and Worcester City Hospital, where he died Aug. 26, aged 40, of nephrosclerosis and diabetes mellitus.

Hines, Sidney Jurry Truley, Tahlequah, Okla. (licensed in Oklahoma by years of practice); an associate member of the American Medical Association; one of the founders of the City Hospital, where he died Aug. 26, aged 86, of coronary occlusion.

Horsley, Henry Lee ⊕ Boaz, Ala.; University of Nashville (Tenn.) Medical Department, 1904; died Aug. 31, aged 82.

Junkin, Samuel Presley ⊕ Little Rock, Ark.; University of Arkansas School of Medicine, Little Rock, 1908; medical superintendent of the Granite Mountain Hospital which he owned; died Aug. 22, aged 79, of cerebral thrombosis.

Kennedy, Herbert Bradley ⊕ Omaha; Emory University School of Medicine, Atlanta, 1917; member of the Industrial Medical Association and the American Trudeau Society; attached to the British Royal Medical Corps during World War I; served as medical director of the Woodmen of the World Life Insurance Company; died Aug. 22, aged 62, of cholelithiasis.

Kuhl, Augustus Bernard ⊕ Davenport, Iowa; University of Nebraska College of Medicine, Omaha, 1903; past-president of the Scott County Medical Society; associated with St. Luke's Hospital and the Mercy Hospital, where he died Aug. 29, aged 79, of cerebral thrombosis.

Lenthall, Theresa Ulla, Parma, Ohio; Friedrich–Wilhelms–Universität Medizinische Fakultät, Berlin, Prussia, 1925; service member of the American Medical Association; associated with the Veterans Administration; died in the University Hospitals, Cleveland, July 4, aged 58, of carcinomatosis.

Leto, Carmelo, New York City; Regia Università di Napoli Facolta Medicina e Chirurgia, Italy, 1906; died July 10, aged 78, of coronary thrombosis.

Luessman, Harold William ⊕ Chicago; Loyola University School of Medicine, Chicago, 1923; served on the staff of St. Francis Hospital, Evanston, Ill., where he died Sept. 14, aged 58, of hepatic failure due to portal cirrhosis of the liver.

McBurney, George Franklin, Belmond, Iowa; State University of Iowa College of Homeopathic Medicine, Iowa City, 1896; died in Lake Worth, Fla., July 1, aged 87, of cerebral hemorrhage.

McConnell, Charles Asa, Hot Springs National Park, Ark.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1905; died Aug. 16, aged 89.

McCoy, Walter Reynolds ⊕ Folkston, Ga.; Atlanta College of Physicians and Surgeons, 1910; veteran of World War I; formerly state senator; member of the city council; died in the Georgia Baptist Hospital, Atlanta, Aug. 31, aged 70, coronary thrombosis and infarction of the myocardium.

McKinney, Mark Ward ⊕ Seattle; Willamette University Medical Department, Salem, Ore., 1908; fellow of the American College of Surgeons; on the staffs of the Seattle General, Doctors, and Columbus hospitals; died Aug. 17, aged 80.

Mankovich, Eugene ⊕ Lakewood, Ohio; Magyar Királyi Pázmány Petrus Tudományegyetem Orvosi Fakultasa, Budapest, Hungary, 1923; served in the Austro-Hungarian Army in World War I; county jail physician; on the staffs of St. Vincent Charity Hospital, St. John's Hospital, and the Lutheran Hospital, Cleveland, where he died Aug. 24, aged 63, of carcinoma of the right lung with metastasis.

Mears, Robert Fuller ⊕ Northfield, Minn.; University of Minnesota Medical School, Minneapolis, 1939; member of the American Academy of General Practice; staff member, Northfield City Hospital; died while attending a stag dinner party on a barge cruising Lake Byllesby near Randolph Aug. 26, aged 45, as the result of strangulation by choking on a piece of steak.

Murphy, Leo Thomas ⊕ Poughkeepsie, N. Y.; University of Minnesota Medical School, Minneapolis, 1920; fellow of the American College of Surgeons; consultant, Matteawan State Hospital in Beacon, North Dutchess Health Center in Rhinebeck, Vassar Brothers, and St. Francis hospitals; died Aug. 24, aged 64, of acute coronary thrombosis.

Myers, Edmund, St. Petersburg, Fla.; Jefferson Medical College of Philadelphia, 1908; an associate member of the American Medical Association; member of the Massachusetts Medical Society; formerly practiced in Boston, where he was on the staff of the Massachusetts Memorial Hospital; veteran of World War I; member of the staff of Mound Park Hospital; died in St. Anthony's Hospital Sept. 4, aged 73, of uremia.

Nacrelli, Vincent Anthony ⊕ Chester, Pa.; Georgetown University School of Medicine, Washington, D. C., 1941; at one time councilman in Marcus Hook; coroner's physician in Delaware County; on the staffs of the Sacred Heart Hospital and the Chester Hospital, where he died Sept. 2, aged 42, of coronary artery disease.

Raihala, John, Sarasota, Fla.; Chicago College of Medicine and Surgery, 1908; for many years practiced in Virginia, Minn.; died at Tower, Minn., Aug. 19, aged 76, of carcinoma of the lung.

Rhodes, Robert E. Lee, Tulsa, Okla.; Southwestern University Medical College, Dallas, Texas, 1905; an associate member of the American Medical Association; associated with the Hillcrest Hospital, where he died Aug. 31, aged 81.

Seidenstein, Jacob Joseph, New York City; Long Island College Hospital, Brooklyn, 1914; veteran of World War I; died in the Veterans Administration Hospital Aug. 13, aged 65, of carcinoma of the prostate.

Sibley, Charles T., New York City; New York Homeopathic Medical College and Hospital, New York City, 1905; died in Oradell, N. J., Sept. 4, aged 82, of pulmonary edema, arteriosclerotic heart disease, and lymphoma.

Smith, James Laurence, Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1904; served as managing director of the Illinois Eye and Ear Infirmary and as managing officer of the Jacksonville (Ill.) State Hospital; died Sept. 11, aged 75, of acute myocardial infarction.

Surbaugh, Ross Dairrel ⊕ Dublin, N. C.; University of Cincinnati College of Medicine, 1951; veteran of World War II; died Sept. 8, aged 39.

Tulgan, Joseph ⊕ Brooklyn; University and Bellevue Hospital Medical College, New York City, 1929; associated with the Coney Island Hospital; veteran of World War I; died in the Holy Name Hospital at Teaneck, N. J., Sept. 16, aged 60.

Uhlemeyer, Henry Adolph ⊕ St. Louis; Homeopathic Medical College of Missouri, St. Louis, 1900; on the staff of the Christian Hospital, where he died Sept. 8, aged 79, of myocardial infarction.

Wallace, Andrew Lee, Los Angeles; Boston University School of Medicine, 1919; died Aug. 18, aged 67, of arteriosclerosis.

Watkins, Barton Hiram, Hobart, Okla.; St. Louis University School of Medicine, 1916; an associate member of the American Medical Association; died in Oklahoma City Aug. 23, aged 68, of rheumatic heart disease.

West, William Daniel ⊕ Belleville, Ill.; St. Louis College of Physicians and Surgeons, 1893; member of the Missouri State Medical Association; died Aug. 24, aged 87.

FOREIGN LETTERS

BRAZIL

Spondylarthritis.—Dr. Nelson Carvalho (*Revista do Hospital das clínicas, são Paulo*, vol. 12, 1957) reported the results obtained with radiotherapy in 515 patients with spondylarthritis. In this series 83% of the patients were clinically cured or improved.

Morbidity in Goiaz.—A report of the health department in the state of Goiaz for 1956 indicates a malarial morbidity of 54%. This rate is considered satisfactory, since the data from which it is derived are of a control program, and the persons checked were suspected to be infected; 4,640 newborn infants from the city of Goiania were examined, but none had malaria. Of 8,569 homes visited, only 111 were found to harbor malarial vectors. The species Anopheles darlingi and Anopheles albitarsis are the principal vectors in the state. In 502 localities 28,338 sick persons received treatment, 108,242 antimalarial tablets being used; 868,444 tablets were delivered to private and official institutions. Three counties were surveyed for Brazilian trypanosomiasis. A rate of 1.41 Triatomas per house was found. Panstrongylus megistus, Panstrongylus infestans, and Triatoma sordida were the species found, and the rate of natural infection was 15.5%. The extensive use of vaccination afforded complete protection against yellow fever. A high incidence (71.5%) of ancylostomiasis was observed. Every patient received tetrachloroethylene, and no toxic effects from the drug were observed. The incidence of trachoma was 5.7%.

ITALY

Asian Influenza.—Many articles have appeared in the press blaming the authorities for not having provided a vaccine in time to prevent the current epidemic of Asian influenza, the first outbreak of which occurred among 150 children in August in a summer camp near Rome. The virus entered the country through the port of Naples. Almost all children in the camp were ill with influenza within a few days. A 10-year-old girl with rheumatic heart disease died from bronchopneumonia two days after the onset of influenza. Two days later a similar epidemic developed in a summer camp at Montelimeto. In less than two days all 71 campers, aged 11 to 17, who had arrived from Naples or its environs were ill. No deaths occurred in this group.

Naples was hit hardest with 14,226 reported cases in the period between Aug. 1 and Sept. 20. Because of the benign course of the disease, undoubtedly many cases were not reported. Consequently, the existence of at least twice as many patients with Asian influenza can be assumed. A more realistic account can be obtained from the Mutual Medical Assistance Service which reimburses its members for the cost of the medicines prescribed by their physicians. The amount paid for prescriptions billed in August was three times as much as was paid in August, 1956. Currently the epidemic has slowed down in Naples, but it is believed that at least 10% of the inhabitants of the city have had the disease.

Between Aug. 1 and Sept. 20 about 10,000 persons in Rome were reported to have contracted Asian influenza. This number should also be doubled. The mortality rate in Rome was higher than that in Naples. There was a mean case fatality rate of 0.25%, and death always occurred as a result of acute pulmonary complications. In Milan, a large industrial city in the North, Asian influenza is more feared than elsewhere because of the prevalence of smog. The vaccination program in Milan is more extensive and better planned than in other Italian cities. On the whole, in Italy Asian influenza has been moderate, but highly contagious.

INDIA

Plasma Sodium and Potassium.—Nath and Chakrabarti (*Indian J. M. Res.* **45**:359 [July] 1957) stated that sodium and potassium play an important role in maintaining the reaction of tissue fluids, osmotic equilibrium, excitability of tissues, and physiological amounts of water in the different compartments. These normal functions are interfered with during operations. Many workers have reported potassium deficiency during the postoperative period, and, as potassium is essential for cellular metabolism, its administration during this period has been strongly recommended. As diet is restricted for a few days after operation, the authors studied the degree of sodium and potassium imbalance in surgical conditions when different types of fluid were given. Estimations of these electrolytes were made before, immediately after, and 24, 48, and 72 hours after operation. The plasma potassium level was reduced while the plasma sodium level showed a concomitant rise in patients who underwent surgical operations and received solutions of sodium chlo-

The items in these letters are contributed by regular correspondents in the various foreign countries.

ride, glucose, or plasma substitutes. This change was only temporary, the values of both the electrolytes returning to normal after 48 hours without the administration of any potassium salt. No significant alteration in the plasma potassium and sodium levels was observed when blood transfusion was given. Thus, not enough hypopotassemia was observed after operations to justify giving potassium salts. Blood transfusion is necessary to prevent hypopotassemia when stress conditions tend to persist.

Vitamin B Complex and Estrogens in Oral Cancer.—V. R. Sathe and co-workers (*Indian J. M. Res.* 45:401 [July] 1957) reported that various etiological factors such as deficiency of the constituents of vitamin B complex, alteration in metabolism of sex hormones, tobacco chewing or smoking, dental sepsis, and syphilis have been associated with precancerous lesions in the mouth such as atrophy of papillae of the tongue, leukoplakia, glossitis, and angular stomatitis. Oral cancer accounts for nearly 20% of all malignant diseases in patients attending the Tata Memorial Hospital, Bombay. Other workers had observed that the excretion levels of nicotinic acid, thiamine, and riboflavin were low in patients with oral cancer and in persons with degenerative and chronic inflammatory lesions in the mouth without any histological evidence of cancer as compared to these values in healthy controls. The authors studied 16 men with oral cancer; 12 had cancer of base of tongue, 2 of the cheek, and 2 of the oropharynx. Diagnosis was established by punch biopsy. All were habitual smokers. Sixteen normal men served as controls. Both groups were hospitalized and kept on a normal hospital diet. Urine was collected for estimation of creatinine, thiamine, riboflavin, and estrogen levels. On the third and fourth day of admission, test doses of nicotinic acid, thiamine, and riboflavin were given orally and the urine examined for estrogen content. On the fifth and sixth days the urine was analyzed to determine the excretion levels of the vitamins and estrogens before the administration of estrogens. The first test dose was given on the seventh and the second was given on the eighth day. Thiamine and riboflavin levels were determined in the urine on the seventh and eighth days.

The excretion levels of thiamine and riboflavin were found to be lower than normal and that of estrogens higher than normal in the cancer patients. Administration of vitamins led to an increase in excretion of estrogens in the cancer patients but not in the controls. Administration of estrogens to the cancer patients decreased the excretion levels of thiamine and riboflavin, but in the controls the values were unaltered. The mean basal excretion level of thiamine in patients with oral cancer was significantly lower than that of the controls, indicating a gross deficiency of thiamine in the cancer patients. A low urinary output of riboflavin was also observed in these patients. The basal excretion level of estrogens in cancer patients was significantly higher than that in the controls. Loading the body with exogenous estrogens created a state of extraordinary deficiency of vitamins B_1 and B_2, which are involved in estrogen metabolism. Administration of the vitamins in the amounts used increased the excretion levels of estrogens, the increase being helpful in restoring the hormonal imbalance. Estrogen treatment appears to be harmful in men with oral cancer, as it induces a deficiency of thiamine and riboflavin.

Kwashiorkor.—V. T. Jayalakshmi and co-workers (*Indian J. M. Res.* 45:431 [July] 1957) determined the serum sodium, potassium, calcium, magnesium, blood urea, total plasma protein, and plasma albumin levels; prothrombin time; and degree of the eosinopenic response to epinephrine in two groups of patients with kwashiorkor, one given 60 and one 100 Gm. of protein daily. The serum sodium and calcium levels were subnormal at first but rose to normal when the high-protein diet was used. The serum potassium and magnesium levels were within normal limits. The prothrombin time was slightly elevated in these patients but returned to normal after treatment. The eosinopenic response to epinephrine, which was unsatisfactory on the admission of a number of these patients, improved after treatment with the high-protein diet. The patients who were given the high-protein diet showed no advantage with regard to either clinical improvement or regeneration of serum albumin. The blood urea concentration was low on the patients' admission but showed a significant increase after treatment.

Influenza in Children.—S. Merchant (*Indian J. Child Health* 6:7 [Aug.] 1957) reported 35 cases of influenza in children requiring hospitalization. The recent influenza epidemic in Bombay affected the children as well as adults, although the highest incidence in children was seen as the epidemic in general was on the decline. The diagnosis was based on a history of influenza in other members of the family and the presence of a markedly congested throat. Of these cases, 30 occurred in children between 6 months and 3 years of age. No infants below 6 months developed the disease. The course of the disease was milder in the 28 patients over 3 years of age. Seven of these patients showed encephalitic manifestations. The rest of the 28 patients in the older age group were grouped as nonencephalitic and had fever as the presenting symptom. Five of these had hyperpyrexia which was resistant to hydrotherapy and antipyretics. Three patients, including two with hyperpyrexia, had marked polyuria and polydipsia, and five had dyspnea. The congestion of the throat in some patients resembled that

seen in measles. Only eight patients had scattered bronchitic signs, and none showed any signs of consolidation or myocarditis. Of these 28 patients 5, including the 3 with hyperpyrexia, died. Various antibiotics (alone or in combination), sulfonamides, and cortisone had little effect on patients with hyperpyrexia. The group with encephalitis had convulsions in addition to fever, four had hyperpyrexia, and six had severe restlessness which was not affected even by large doses of sedatives. Polyuria, loss of consciousness, and bulging fontanelle were present in some. Examination of the spinal fluid revealed no abnormality except increased tension. Four of these seven patients died. The author suggested that polyuria and hyperpyrexia are produced as a result of involvement of the hypothalamus.

Serum Glycoprotein and Sedimentation Rate in Pulmonary Tuberculosis Patients.—A. L. Bhatia and coworkers (*Indian J. M. Res.* 45:299 [July] 1957) stated that the content of glycoprotein fractions is abnormally high in the serum of patients with various pathological conditions. The authors studied the relationship between the hexose content derived from one of the serum glycoproteins, the sedimentation rate, and the activity of the disease in patients with pulmonary tuberculosis. Eighteen samples of blood were collected from normal persons, 6 from patients with arrested tuberculosis, and 71 from patients with active tuberculosis. A close relationship between the activity of the disease and the glycoprotein fraction was observed in patients with moderately advanced and far advanced disease, which group formed about 87% of the patients tested. In 48% of the patients both the sedimentation rate and the hexose content gave values increased in proportion to the activity of the disease, and in 39% only the hexose content was increased, but the sedimentation rate failed to indicate the extent of the disease. In patients with minimal activity of the disease, the values of the hexose content and the sedimentation rate were more in line with those of the normal and arrested cases. The hexose content was thus a dependable guide only in patients with moderately advanced and far advanced disease.

Serum Lipid Partition in Patients with Leprosy and Tuberculosis.—Gokhale and Godbole (*Indian J. M. Res.* 45:327 [July] 1957) stated that the lipolytic enzyme activity of the blood is affected in certain pathological conditions. This change is supposed to be due to an altered fat metabolism. The authors studied the lipolytic enzyme activity and its relation to lipid partition in the serum of 165 healthy subjects, 105 patients with leprosy, and 103 patients with tuberculosis. The serum constituents studied were phospholipids, total cholesterol, total fatty acids, total lipids, lipolytic esterase, and lipase with and without sodium tauroglycocholate activities. The average figures obtained in patients with leprosy and those with tuberculosis were compared with those obtained in normal subjects. In patients with leprosy or tuberculosis the serum lipid constituents were higher than in normal subjects, but the lipolytic enzyme activity gave lower figures than normal. This difference was greater in patients with leprosy than in those with tuberculosis. This increase in the serum constituents and the decrease in the serum lipolytic enzyme activity indicate a disturbance in the fat metabolism in these two diseases.

PERU

Tranquilizers.—A symposium on the use of tranquilizers in psychiatry was held at Lima in July.

Chlorpromazine.—Dr. M. Chicata gave chlorpromazine to 45 hospitalized schizophrenic and 9 manic-depressive patients. This drug was given in an average daily dose ranging from 75 to 500 mg., and in about 67% of the patients one or more of the conventional physical therapeutic procedures was also used. More than half of the whole group had previously received other treatments. Total remissions were observed in 80% and social remissions in 10% of the schizophrenic subjects ill for a year or less, whereas in those who had been ill more than a year these percentages were 37.7 and 33.3 respectively. In the manic-depressive group, all of the patients showed substantial improvement in the first three months of treatment. Most of the patients who were improved were discharged and advised to take a maintenance dose of 100 to 200 mg. daily. Because of the shortness of the follow-up, the author reached no conclusion regarding the long-term results of this treatment, but he believed this drug to be helpful in the symptomatic management of these psychoses. The combination of chlorpromazine and electroshock therapy proved to be most effective for the schizophrenic and manic patients and chlorpromazine with promethazine and drug-induced sleep for the depressive patients. The treatment of choice must depend on the form of the psychosis, the duration of the process, and the type of treatment previously used.

Dr. A. Cano treated a series of 106 patients with diverse forms of psychoneuroses with chlorpromazine. A small initial dose (50 to 75 mg. daily) of the drug was used and was gradually increased according to the clinical response. A therapeutic dosage of 100 to 150 mg. daily was reached in 62% of the patients, 200 to 400 mg. in 29%, and 600 to 1,200 mg. in 9%. But for the very agitated patients, the oral route was preferred. When necessary, barbiturates or stimulants were also given. In most patients with obsessive neurosis, anxiety neurosis, and hypochondria, psychotherapy was systematically applied. The best results were obtained in the

patients with hysteria and paranoid states; all of the former and 80% of the latter were markedly improved. In patients with neurosis or hypochondria, the response to the treatment was less gratifying; only 30% of the former and 50% of the latter reached either social or complete remissions. The drug checked the psychoneurosis in 60% of the patients suffering from reactive syndromes. Extrapyramidal side-effects from chlorpromazine were noted only in patients receiving more than 800 mg. daily, and, when present, they were only moderate.

Dr. M. Almeyda spoke on the use of chlorpromazine in alcoholic patients. In 30 with acute alcoholism and in an agitated state, he obtained a prompt and marked relief of the symptoms with the parenteral administration of this drug, the psychomotor hyperexcitability and the vomiting being promptly stopped by it. Similar favorable symptomatic responses were observed in patients with acute postalcoholic states and in patients with alcoholic psychosis, but the drug failed to prevent delirium tremens in most cases. The speaker stressed the fact that chlorpromazine and other tranquilizers do not modify the psychopathological cause of the addiction to alcohol but give only symptomatic relief. Dr. Carrilo Broatch, however, cited the histories of three patients with delirium tremens who were greatly improved by chlorpromazine given parenterally.

Reserpine.—A therapeutic trial with reserpine in 159 ambulatory and hospitalized psychotic patients was reported on by Dr. R. Jerí. A small proportion of these patients had been treated previously with physical and/or surgical procedures. The initial daily dose was usually 10 to 20 mg. and the maintenance dose 1 to 8 mg. After follow-up periods of four months to three years, the results were good in 16 patients, fair in 32, slight in 41, and poor in 70. Since relapses following the discontinuance of the therapy were common, a daily maintenance dose was given to every improved patient. Demelioration, however, frequently occurred even in spite of the continued treatment and the author was compelled to resort to physical therapy. The author concluded that (1) reserpine is of limited value in the management of psychotic patients, but it is worth a trial in acute cases where it should be given in appropriate doses for four to six weeks and in chronic, rebellious cases just before drastic surgical procedures are attempted; (2) the chief action of the drug is temporary modification of the anxiety states; (3) it has no significant effect on the basic psychopathological disturbances; (4) the longer the duration of the disease the poorer the response to reserpine; (5) no significant relationship was noted between the daily dose given and the therapeutic results; (6) whenever shock therapy is indicated because of a failure with reserpine, a minimum of eight days should elapse between the withdrawal of the drug and the application of shock; (7) dangerous undesirable side-effects rarely occur in reserpine-treated patients; (8) patients with the catatonic and paranoid forms of schizophrenia get the best results from reserpine; and (9), in general, the drug seems to be inferior to chlorpromazine in the management of psychoses.

Dr. C. Saavedra S. reported a series of 15 patients (9 women and 6 men), suffering from schizophrenia of six or more years' duration, who received reserpine only after having failed to respond to several therapeutic procedures. Reserpine was given parenterally at first in a daily dose of 2.5 mg. After one week the drug was given by mouth and the dosage slowly increased until an average daily maintenance dose of 6.8 mg. in the women and 10 mg. in the men was reached. The men showed no improvement in spite of several months of treatment; two women had a social remission, six were improved, and one was not benefited.

Side-effects.—A distinct and paradoxical psychomotor hyperactivity in patients taking chlorpromazine or reserpine was described by Drs. G. Mori and M. Chicata. This undesirable side-effect has been reported by numerous psychiatrists, but attention has been directed chiefly to elucidating its physiopathology rather than its clinical manifestations. The authors observed the syndrome in 10 of 65 psychiatric patients who received chlorpromazine, reserpine, or both. They noted that it is characterized by (1) a compulsion to move so that the patients are unable to remain in one position, the words used by them to describe their feelings being strikingly similar, (2) a subjective restlessness (the patients say they feel this restlessness throughout their bodies), (3) an increased awareness of their surroundings which renders them hypersensitive to any external stimulus, and (4) insomnia. Because these patients have no hallucinations or other perceptual disturbances, this syndrome is not to be regarded as a symptomatic psychosis.

Drs. Chicata and Beteta pointed out that chlorpromazine and/or reserpine give rise frequently to untoward neurological side-effects. In a series of 45 psychotic patients receiving these drugs, bradykinesia was noted in 38; Parkinson-like trembling in 24; muscular hypertonia and amimia each in 22; postural hyperreflexia in 18; neurovegetative disturbances in 17; speech disorders in 14; inhibition of automatic motion in 9; akathisia in 7; Aran-Duchenne-like atrophy in 3; micrography, anisocoria, and pyramidalism each in 22; and changes of the deep sensibility, nystagmus, and severe oculogyric crisis each in one. In most patients the neurological complications were transient, and rarely were they serious enough to warrant discontinuation of the treatment. A definite relationship between the dose and time of administration of the drug and the occurrence of the neurological side-effect was noted. The same doctors reported on three patients suffering from progressive dementia paralytica who

responded dramatically to treatment with penicillin and chlorpromazine. The latter proved particularly helpful in controlling the productive symptoms of the psychosis but failed to improve the neurological and serologic signs of the disease. A maintenance dosage was necessary.

Azacyclonol.—Dr. A. Saavedra V. treated nine patients who had symptomatic psychoses with azacyclonol. In one the psychosis was caused by infection, in two by toxic conditions, in five by cerebral arteriosclerosis, and in one schizophrenia was complicated by an infection-induced psychosis. Azacyclonol was given orally in doses of 100 to 400 mg. daily, except for the last-mentioned patient who received 600 mg. In most patients this drug was given only after such other tranquilizers as chlorpromazine, reserpine, or meprobamate had been tried. The exogenous symptoms subsided shortly after the treatment was started, and a total remission was attained within the first 10 days of therapy in eight patients; in the schizophrenic patient only the agitation syndrome due to the infection yielded to the treatment. The author stated that, in general, clinical response appears to occur more rapidly with azacyclonol therapy than with other forms of treatment. This rapid response indicates that azacyclonol may be used as a diagnostic aid. If a patient believed to have symptomatic psychosis is given this drug, clinical improvement should occur within three to eight days, otherwise an endogenous psychosis is to be suspected and physical therapeutic procedures resorted to.

Dr. G. Sánchez warned against the indiscriminate and arbitrary use of the tranquilizing drugs because of the wide range of side-effects frequently observed. Addiction and even death may result from their continued use.

Drug Therapy in Infant Psychiatry.—At the same meeting, Dr. Emilio Majluf said that diphenhydramine hydrochloride syrup was given, in daily doses ranging from 10 to 90 mg., to 75 infants with various conditions. This proved helpful in controlling restlessness and sleep disorders, but its general usefulness diminished as the age increased. There were no undesirable side-effects except slight somnolence. Chlorpromazine was used in 150 patients affected with psychosis, mental deficiency, primary or secondary behavior disorders, epilepsy, stammering, and cerebral palsy. Children showing restlessness, negativism, agitation, or aggressive or destructive tendencies were specially selected to be given this therapy, and in many of them a favorable response was observed, but the symptoms tended to return after the chlorpromazine was withdrawn. In some patients, notwithstanding the administration of relatively large doses, there was no improvement. These failures were observed mainly in children with mental retardation. The best results were elicited in children with behavior disturbances and the so-called organic brain syndrome who showed a marked diminution of the aggressiveness and agitation especially when use of promethazine hydrochloride was added to the treatment. At the start of the treatment, chlorpromazine was given in daily doses of 12.5 to 37.5 mg. The dosage was progressively increased until a daily dose of 100 or 150 mg. in children over 2 years of age was reached. The complications most frequently noticed were somnolence and skin discoloration. The liver function tests in some patients receiving large doses were found to be abnormal, but concomitant clinical manifestations were lacking. In epileptic children the chlorpromazine proved to be helpful by reducing the frequency of the attacks and minimizing the behavior disorders known to occur in these patients. In those with status epilepticus, the drug given intravenously succeeded in some cases in arresting the seizures.

About 100 of the children who showed agitation, aggressiveness, destructive tendencies, or psychosis were given reserpine. The clinical response, although generally encouraging, was inferior to that obtained with chlorpromazine, but those children with nervous tics responded better to reserpine. This drug was given in daily doses of 0.1 to 10 mg., depending on the severity of the spasms. Nasal stuffiness and, less frequently, gastrointestinal disturbances were the complications most frequently observed in children receiving reserpine. No Parkinson-like syndromes were observed in children taking either drug. Mephenesin gave some benefit in certain patients with cerebral palsy, but it failed to bring relief to psychotic children. On the other hand, it deserves trial in stammerers. Meprobamate was useful in treating behavior and sleep disorders. This drug was given to 34 children, 22 of whom showed behavior disorders and 7 of whom were mentally retarded. This drug is the medicament of choice in infant psychiatry, because it is well tolerated and relatively nontoxic. The therapeutic dose is 200 mg. three times daily. In some patients, however, this dosage was progressively increased without causing major side-effects.

Glutamic acid was given to 79 patients in an average daily dose of 12 Gm. Mongolism, present in 19 of them, was the condition most benefited by this drug, especially when it was given early in the course of the disease. Glutethimide was given to a few patients, and it was found to be a fairly good hypnotic and sedative. Promazine (Liranol) was not tolerated by the one patient to whom it was given. All of the drugs tested gave some symptomatic relief to patients with one syndrome or another, but none had a specific action on the cause. Chlorpromazine was the most promising and had the broadest field of action in infant psychiatry. Despite their lack of specificity, the tranquilizing drugs have a favorable effect on the integrative functions of the ego.

MISCELLANY

THE DEPENDENTS' MEDICAL CARE PROGRAM (PUBLIC LAW 569–84TH CONGRESS)

AN INTERIM PROGRESS REPORT TO CONGRESS FROM THE DEPARTMENT OF DEFENSE

1. Purpose and Scope.—This report is rendered on the verbal request of the Armed Services Committee, House of Representatives, U. S. Congress. The report is also furnished to the Armed Services Committee, U. S. Senate. Its purpose is to inform the Committee of the progress of the Dependents' Medical Care Program which was brought into being by Public Law 569, 84th Congress. This report primarily covers Title II of the Law. This Law had an effective date six months after approval (7 December 1956). Except for those data herein which are stated to have been derived from sample studies, the operational data cover the period from the beginning of the Program to 1 July 1957 (slightly more than six months). Data herein are derived from reports, claims, correspondence and other information which have reached the Office for Dependents' Medical Care. No recommendations for changes in the Law regarding the concept or scope of the Program are contained in this report. More experience is considered necessary before the need for such changes can be determined.

2. *Method of Operation of Program.*—Public Law 569 delegated the operation of the Program to the Secretary of Defense and provided for consultation with the Secretary of Health, Education and Welfare in preparation of plans and regulations. The Secretary of the Army was designated the Executive Agent for the civilian part of the Program in the United States, Alaska, Hawaii and Puerto Rico. Its operation was further delegated, through appropriate Staff agencies, to The Surgeon General of the Army. The latter, because of the nature of the Program and because it encompassed medical care for dependents of members of the Navy, Marine Corps, Air Force, Coast Guard, and the commissioned members of the Public Health Service and the Coast and Geodetic Survey as well as the Army, set up a separate office for the administration of the Program. The Office is known as the Office for Dependents' Medical Care and its head has been designated Executive Director for the Program. The Office for Dependents' Medical Care has consummated contracts with Blue Cross and Mutual Benefit Health and Accident Association of Omaha, Nebraska, to act as Fiscal Administrators for the payment of hospital and nurses' claims in designated states and other areas. Contracts have been consummated with State Medical Societies, Blue Shield Plans, and Commercial Insurance Companies to act as Fiscal Administrators for payment of claims of civilian physicians. Questions, differences, and disputes concerning operation of the Program which cannot be resolved locally are sent to the Office for Dependents' Medical Care. The Executive Director utilizes three (3) Advisory Committees. A Medical Service Advisory Committee consisting of representatives of the Army, Navy, Air Force, and Public Health Service meets formally each month and its members serve as daily contacts, when necessary, to resolve "Medicare" problems involving personnel of the respective services. The American Medical Association maintains a "Medicare" Committee which meets periodically to discuss matters which affect the physicians of the nation and has designated a physician in its Washington Office as a day by day contact. The American Hospital Association maintains a similar committee which also meets with the Executive Director to discuss problems affecting hospitals and has named an executive in its Washington Office as a contact. The Secretary of Defense also has an Advisory Committee for Dependents' Medical Care which has had two meetings (8 September 1956 and 17 May 1957) to consider problems and watch progress of the Program. The operation of the Program is depicted diagrammatically in Chart 1.

3. *Historical Brief*

a. Development Period (7 June 1956 to 18 October 1956): A Task Group consisting of representatives of the Army, Navy, Air Force and Public Health Service was organized by the Secretary of Defense. Throughout the deliberations of the Task Group (later known as the Interservice Committee) representatives of the Health Insurance Industry, the Blue Cross Commission, the Blue Shield Commission, the American Medical Association, and the American Hospital Association were frequently consulted. This Group formulated the Joint Directive, the Joint Regulations, the format of the Schedule of Physicians Allowances and the claim form for operation of the Program. This Group also did much work in preparing the medical profession for the Program by presentations at meetings. The Joint Directive, which was signed by the Secretary of Defense and the Secretary of Health, Education and Welfare on 18 October 1956, was the basis for all necessary regulations, contracts, claim forms, and informational material upon which the operation of the Program was later based. Some of the principles promulgated by the Joint Directive, which are basic to the Program, are considered worthy of special mention:

(1) Standards of Medical Care per se were not delineated; however, definitions of physician, hospital and certain hospital accommodations do, in effect, set standards.

(2) Maximum Fee for Physicians' Services would be negotiated on the basis of a Schedule of Allowances, format for which was circulated to all State and area Medical Societies. The latter were requested to insert fees which would represent the maximum amount physicians could charge for each procedure performed under the Program. The fees were to be based on a Physician's normal charges to a private patient having an income of approximately $4,500.

(3) Provision for Additional Fees to Physicians performing unusually difficult procedures or encountering unusual complications upon their submission of a Special Report.

(4) Full Payment for Authorized Service Rendered in approved civilian sources by physicians, nurses and hospitals was established by enumerating specifically the charges patients had to pay. (This principle has come under much discussion in medical groups and has been responsible for two State Medical Associations to decline participation in the Program.)

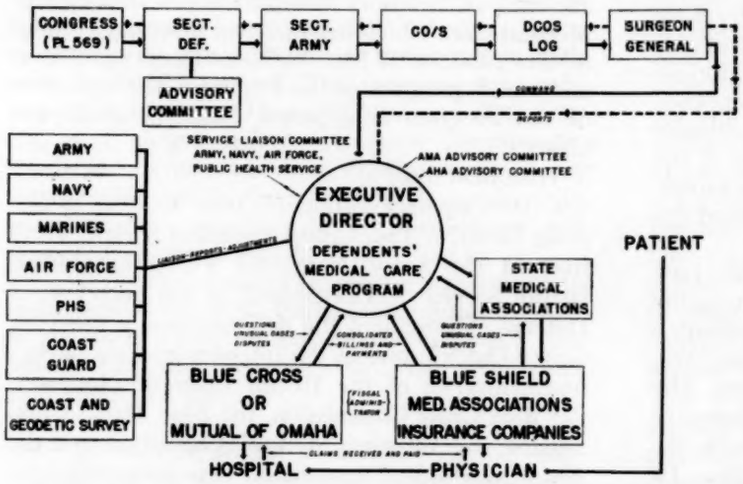

Chart 1.—Schematic representation of the operation of the Dependents' Medical Care Program.

(5) Free Choice between Uniformed Services and civilian medical facilities, as contemplated by the Law, except where restrictions are made by the Secretary of the Service concerned with the approval of the Secretary of Defense, was specifically stated. This has been a great factor in the acceptance of the Program by the civilian medical profession. (No area has been declared restricted at this writing and no requests for restriction have been brought to the attention of the Office for Dependents' Medical Care.)

(6) Prompt Payment by delegation of the paying function by contract to Medical Associations, or local insurance companies or health plans normally in the business of paying hospital and physician claims.

(7) Local Adjudication by providing for local Medical Societies to make recommendations on questions of medical practice or charges.

b. Implementation Period (3 September 1956 to 7 December 1956)

(1) The Office for Dependents' Medical Care was organized with the idea of integrating the many heterogenous activities pertinent to the operation of of the Program into compact units to effect efficient and effective administration with a minimum of personnel and attendant costs. Two major units were established, one to conduct the "business" functions (e. g., contracting, budgeting, accounting and auditing), the other to maintain liaison and rapport with the seven uniformed services, and medical and allied professions, hospital organizations, and the dependents themselves. Both units are designed to detect weaknesses and faults and design corrective measures. The office was established in the Office of The Surgeon General, U. S. Army, and commenced operations on 3 September 1956. Key civilian personnel have not all been obtained even at this writing.

(2) Development of Contracts was accomplished in accordance with Directives issued by the Secretary of Defense which contained stipulations that all aspects of the contract procedure would be carried out in accordance with the Armed Services Procurement Regulations. Within the scope of these Directives, two basic types of cost-type (nonprofit) contracts were developed—one for the payment of physicians and the other for the payment of hospitals and private duty nurses. In developing these contracts, at times it was necessary to request deviations from the Armed Services Procurement Regulations when provisions pertinent to supply and construction contracts were not deemed applicable or appropriate to the "Medicare" Program. (For example, in one instance request was made to permit the allowance of negotiating costs, since under a nonprofit contract the contractor would have no other basis for recovery of those expenses.) As deviations became necessary, they were approved upon request and justification. Close coordination was maintained with representatives of the American Medical Association and the Blue Shield during the development of the physician contract and with representatives of the Blue Cross and the Insurance Industry during the development of the hospital contract. Representatives of each of these organizations took an active role in the development phase of the Program and submitted many constructive comments. Repre-

sentatives of the Army Audit Agency and the General Accounting Office also participated actively throughout the development of the contracts.

(3) Negotiation and Consummation of Contracts was effectively accomplished with all parties concerned. It was necessary to obtain approximately 40 officers and civilian employees on a temporary basis. These personnel returned to their respective assignments as their duties were completed. The Surgeon General, The Judge Advocate General, other Technical Services of the Army, the Army Audit Agency and the other Uniformed Services were all extremely cooperative in providing their assistance.

(a) Physicians Contracts were primarily directed toward the establishment of maximum physicians fees. The Inter-Service Committee, in August 1956, contacted each Medical Association asking them to determine a fee structure to be used as a basis for negotiation and to name an agency which it desired to act as its Fiscal Agent. As nominations for Fiscal Agents were received, the Army Audit Agency conducted pre-award surveys to determine performance potential. In late September 1956, a copy of the proposed contract was sent to each medical society with the request that, on a designated date, its representatives and those of its Fiscal Agent come to Washington, D. C., to negotiate. Six states were scheduled for negotiation every 48 hours, commencing 24 October 1956. To meet this schedule, six negotiating teams and one master contract team were constituted within the Office for Dependents' Medical Care. Each team consisted of a procurement officer, a physician, a lawyer, and an auditor. Fiscal Agents designated by medical societies varied considerably. Some societies designated themselves; others appointed a local Blue Shield; two societies selected Blue Shield to take over medical society functions; and Alaska selected Washington State Blue Cross. During negotiations, representatives of the American Medical Association were provided office space in the Office of The Surgeon General to assist negotiators. Negotiations were successful, and on 7 December 1956 contracts were in effect in all but the following states:

Maine	Local Blue Shield required legislature charter amendment to contract under "Medicare" Program and was taking necessary action.
Rhode Island	Medical Society's proposed fee schedule was not acceptable to the Government.
Ohio	State Medical Society declined to contract for a full service coverage medical program.
Alabama	State Medical Society hesitant to contract for a full service coverage medical program and was unable to obtain a Fiscal Agent acceptable to the Government.
Texas	Medical Society proposed fee schedule was not acceptable to the Government.
Florida	Contract was consummated on 10 December 1956.

Subsequently, all of the states entered into complete contractual arrangements except Maine, Ohio and Rhode Island. The Maine legislature has amended the Charter of the Blue Shield in that State effective 28 September 1957, at which time it is expected contractual arrangements will be consummated. Mutual of Omaha has accepted a contract to pay physicians in Ohio and Rhode Island, the former on the basis of a Schedule of Allowances mutually agreeable to the Ohio Medical Association and the Government, the latter on a Schedule promulgated by the Government. The present situation with regard to the contractual arrangements is shown on Chart 2.

(b) Hospital Contracts involved only two contractors. The Secretary of Defense directed that contracts for the payment of hospitals be negotiated with Blue Cross and the Commercial Insurance Industry. He also suggested the states to be serviced

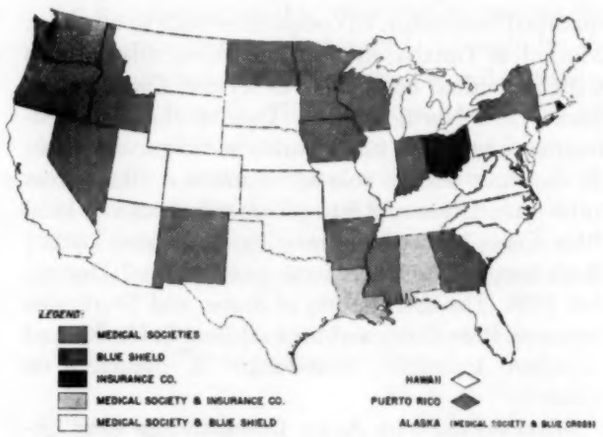

Chart 2.—Fiscal administrators for payment of physicians' claims.

by each. The allocation of Alaska, Hawaii and Puerto Rico to Blue Cross was made by the Executive Director. In an effort to identify potential contractors in the insurance industry, approximately 850 individual companies writing health and accident insurance were solicited via three insurance trade associations and the Small Business Administration. A synopsis of proposed procurement was published by the Department of Commerce. Approximately 48 insurance companies indicated an interest in the Program. Upon further correspondence, only the Continental Life Insurance Company and the Mutual Benefit Health and Accident Insurance Associa-

tion of Omaha, Nebraska, evidenced that they were desirous of handling the entire area allocated to the insurance industry. For reasons of economy and ease of administration, the capability of servicing the entire area was a prime factor in selection. Both of these companies were requested to come to Washington, D. C., for negotiations. Prior to negotiations, the Continental Life Insurance Company withdrew its interest and negotiations were held with Mutual of Omaha which was found to be a

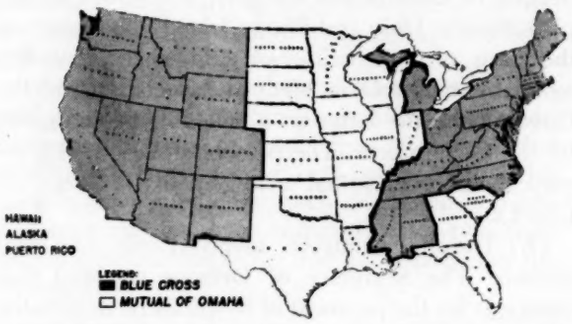

Chart 3.—Fiscal administrators for payment of hospital claims.

qualified contractor. In compliance with its contract, Mutual of Omaha entered into three subcontracts with individual companies to service Kansas, Louisiana, and North Dakota. Two of these subcontractors are in the small business category. (NOTE: In carrying out its role as contractor, Blue Cross subsequently entered into subcontracts with 55 local Blue Cross plans throughout its designated areas.) Both hospital contracts were in effect on 7 December 1956. The distribution of States and Territories between Blue Cross and Mutual Benefit Health and Accident Insurance Association is depicted on Chart 3.

(c) Payments by Army Commanders were anticipated in that certain contracts might not be consummated by 7 December 1956 and procedures were formulated whereby Army Commanders would take over the role of contractors and make payments to physicians or hospitals in the areas concerned. This prior planning proved fruitful, for on 7 December 1956 it was necessary for Army Commanders to function in the role of physician contractors in the following areas:

First Army Commander	Maine and Rhode Island
Second Army Commander	Ohio
Third Army Commander	Alabama
Fourth Army Commander	Texas

Subsequent to 7 December 1956, contracts were consummated for all states except Maine, as indicated:

With State Medical Society and designated Fiscal Agent:

Texas	7 January 1957
Alabama	21 February 1957

With an Insurance Company as Fiscal Agent; Medical Society not a party to the contract:

Ohio	14 January 1957
Rhode Island	1 April 1957

4. *Operational Experience from 7 December 1956 to 1 July 1957*

a. Claims and Costs: As of 1 July 1957, a total of 103,595 hospital claims totaling $10,732,272.81 had been received in the Office for Dependents' Medical Care. As of the same date 127,902 physicians claims had been received totaling $8,805,128.28. The average cost of the hospital claims was $103.60; that of the physicians claims, $68.84. Administrative costs for the hospital claims had been $259,803.98; for physicians claims $416,532.93. (NOTE: These costs have not been audited, the contracts providing for audit after 1 July 1957. It should be pointed out also that the Claims and Costs do not represent all authorized service rendered during this period because claims are still being received for services performed during the early months of operation of the Program.) Tables 1 and 2 show the distribution of the above Claims and Costs between the four services responsible for the fiscal accounting for the medical care of dependents of all seven Uniformed Services.

In addition to claims recorded in Table 2, Army Commanders have reported paying 2,016 physicians' claims with a cost of $145,320.20. Overseas commands have reported 89 approved medical care claims in the amount of $7,335.94. Overseas Commanders are authorized to make arrangements for civilian medical care when indicated. The number of claims and costs, by overseas area, are shown in Table 3.

TABLE 1.—*Hospital Claims Received in Office for Dependents' Medical Care (7 December 1956 to 1 July 1957)**

Per Cent	Claims	Service	Cost	Per Cent
27.1	28,056	Army	$ 2,893,078.34	27.0
40.0	41,500	Air Force	4,238,516.14	39.4
30.6	31,704	Navy	3,346,763.75	31.2
2.3	2,335	Public Health Service	253,914.58	2.4
100.0	103,595	Total	$10,732,272.81	100.0
Average Cost per Claim				$103.60

	Hospital Care Cost	Administrative Cost	Total Cost
Army	$ 2,893,078.34	$ 69,874.69	$ 2,962,953.03
Air Force	4,238,516.14	99,154.81	4,337,670.95
Navy	3,346,763.75	84,393.00	3,431,156.75
PHS	253,914.58	6,381.48	260,296.06
Total	$10,732,272.81	$259,803.98	$10,992,076.79
Number of Contractors Billing			2
Total Billings Received			20

* Source: Office for Dependents' Medical Care, 1 July 1957.

b. Distribution Between Services: Chart 4 indicates the distribution of the hospital plus physician costs between the Army, Navy, Air Force, and Public Health Service on the basis of Vouchers received in the Office for Dependents' Medical Care for the months of January thru June. The trend has been approximately in the same proportion throughout the period and would indicate that Air Force dependents account for approximately 40% of the Program, Navy—32%, Army—26%, and Public Health Service 2%.

c. Cost by Diagnosis and by Patient Day: Early in July 1957, a special cost study was made on the basis of the claims received from eight states (California, Colorado, Florida, Kentucky, Texas, New York, Washington, and Wisconsin) during the period 7 December 1956 to 1 June 1957. In order to make the study as accurate as possible, only those cases were included for whom at least one claim from an attending physician *and* one claim from a hospital had been received. There is no assurance that all claims of anesthesiologists, pathologists, consultants, private duty nurses, and others who may have rendered compensable care to these patients are included. Occasional claims for service rendered even in December are still being received in the Office for Dependents' Medical Care. The over-all information from this report is shown in Table 4.

All diagnoses appearing more than 45 times in the study were segregated and costed. As might be expected, maternity cases head the list and tonsillectomies are second. The diagnoses, total cost of physician and hospital, average cost per case and average days in the hospital are shown in Table 5.

d. Hospital Contractors Performance: In May 1957, a study was made of the hospital claims then on hand to determine costs to the Government in the areas serviced by Blue Cross and those serviced by Mutual of Omaha. Excluding the amounts paid by the patients, this study, comprising 17,255 Blue Cross claims and 19,667 claims from Mutual of Omaha, indicated the average cost in the Blue Cross area was $20.86 per patient day and that for the Mutual of Omaha area was $18.78. Administrative

TABLE 2.—*Physicians' Claims Received in Office for Dependents' Medical Care (7 December 1956 to 1 July 1957)**

Per Cent	Claims	Service	Cost	Per Cent
24.7	31,472	Army	$2,244,485.64	25.5
41.2	52,746	Air Force	3,570,551.54	40.5
31.9	40,890	Navy	2,796,624.17	31.8
2.2	2,794	Public Health Service	193,466.93	2.2
100.0	127,902	Total	$8,805,128.28	100.0
Average Cost per Claim				$68.84

	Physicians Cost	Administrative Cost	Total Cost
Army	$2,244,485.64	$101,516.25	$2,346,001.89
Air Force	3,570,551.54	165,155.20	3,735,706.74
Navy	2,796,624.17	140,503.07	2,937,127.24
PHS	193,466.93	9,258.41	202,725.34
Total	$8,805,128.28	$416,423.93	$9,221,561.21
Number of Contractors Billing			52
Total Billings Received			823

* Source: Office for Dependents' Medical Care, 1 July 1957.

TABLE 3.—*Medical Care Claims from Overseas Areas Received by Office for Dependents' Medical Care (7 December 1956 to 1 July 1957)**

Vienna, Austria	7	$ 732.50
British Honduras	2	164.50
Ottawa, Canada	6	345.29
USARCARIB, Canal Zone	14	1,015.68
Costa Rica	1	81.74
Copenhagen, Denmark	1	88.60
San Salvador, El Salvador	?	81.26
Heidelberg, Germany	41	2,339.90
New Delhi, India	2	115.24
Italy	8	1,584.30
Singapore, Malaya	3	90.89
Mexico City, Mexico	1	172.43
Union of South Africa	2	480.61
Cambodia	1	43.00
Total	89	$7,335.94

* Source: Office for Dependents' Medical Care, 1 July 1957.

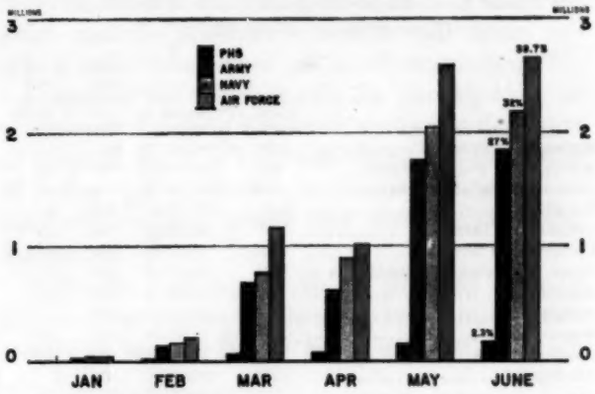

Chart 4.—Distribution of costs (physicians and hospital) by service as indicated by claims received by month.

TABLE 4.—*Costs per Case and Patient Day (Special Study—Eight States)**

	Totals	Averages
Claims	19,878	
Claims per Case		2.4
Patients (Cases)	8,326	
Hospital Days	35,155	
Hospital Days per Case		4.2
Cost	$1,743,349.26	$209.39 per Case
Hospital	851,486.81	102.27 per Case
Physician†	891,862.45	107.12 per Case
Per Hospital Day per Patient		49.59
Hospital		24.22
Physician†		25.37

* Source: Office for Dependents' Medical Care, July 1957.
† Physicians costs include care furnished before and after hospitalization (e. g. pre and post-natal care).

costs have not yet been audited and are, therefore, subject to change in accordance with the provisions of the contracts, but these costs, at the time of the study, were $4.48 a claim for Blue Cross and $2.22

TABLE 5.—*Costs per Diagnosis and Hospital Days (Special Study—Eight States)**

	Patients (Cases)	Total Cost (Physician & Hospital)	Average Cost† per Case	Average Days in Hospital
Maternity Delivery (Uncomplicated)	2,886	$ 646,986.25	$224	4.5
Miscarriages and Abortions	345	53,512.81	155	2.5
Complications of Pregnancy	75	12,788.74	171	4.5
Tonsillitis	1,848	210,357.27	113	1.4
Respiratory Infections	378	61,838.51	164	5.9
Uterovaginal Prolapse	56	28,455.03	508	8.3
Other Gynecological Conditions	346	80,661.38	233	5.7
Appendicitis	125	41,824.91	335	4.4
Hernia	120	35,427.88	295	4.3
Hemorrhoids	53	15,365.08	290	6.0
Gastroenteritis	104	13,680.95	132	5.3
All Others‡	1,990	543,392.45	273	
Total	8,326	$1,743,349.26	$209	4.2

* Source: Office for Dependents' Medical Care, July 1957.
† Rounded off to even dollar for easier comparison.
‡ Includes 383 separate diagnoses, none appearing more than 45 times.

for Mutual. This information is depicted on Chart 5. No positive conclusions can be made at this time concerning the final costs to the Government in these two areas. A comparison was made of costs in California and Tennessee (Blue Cross area) with Hospital Guide—1956 data*; also, in the Mutual of Omaha area using Texas and Indiana. In this comparison, the payments made by patients, approximating $5.00 per day, was added to Government costs in order that the figures would be more comparable. While it is evident that patient income, as

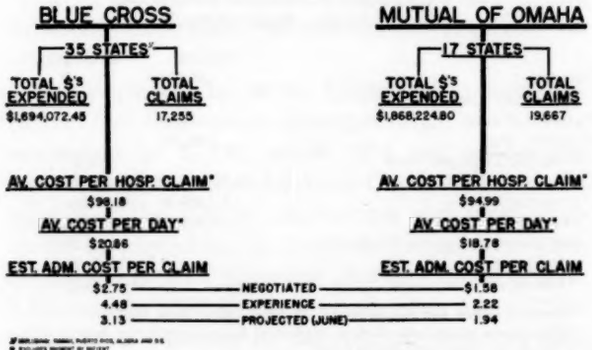

Chart 5.—Comparison of hospital costs in areas covered by Blue Cross and Mutual of Omaha. (Represents actual cost to the government.)

reported in Hospital Guide, includes a much larger variety of patients and a greater range of hospital accommodations than is included in the Dependents' Medical Care Program, it would appear that the cost for dependents hospitalization under the Program is in line with normal patient income. In California, hospital costs per Dependent Medical Care patient per day were $30.65, whereas the average patient income per patient day of hospitals in California was $32.20. In Tennessee, respective figures were $22.15 and $21.05; in Texas, $26.68 and $24.84; and in Indiana $22.83 and $22.56 (Chart 6).

e. Age and Sex of Patients: A study of some 20,000 physicians' claims in April 1957 indicated the age and sex distribution of patients. As would be expected, 80% were female and 20% male, the latter being principally children under 14 (Chart 7).

f. Patients Residing Away from Sponsor: Approximately 42% of a sample of 1,000 hospital claims indicate that sponsor of patient is overseas, on a ship, attending a school, or otherwise is living apart from his family (Chart 8).

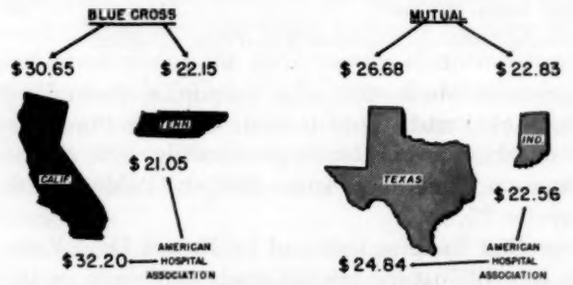

Chart 6.—Average per diem cost for hospitalization in four states (two in Blue Cross area, two in Mutual of Omaha area) as compared with Hospital Guide figures in 1956 publication. Amount patient paid has been added for comparison purposes.

g. Diagnosis of Patients: A sample study of 5,000 physicians' claims by diagnosis has been made and tabulated in Chart 9. 28.8% were normal deliveries, 17.4% were tonsillectomies, 8% surgery on female genital system. Medical and pediatric care is largely listed in hospital visits and accounts for 18.1% of the cases.

5. *Acceptance of the Program*

a. By Physicians: The physicians of the United States, Alaska, Hawaii, and Puerto Rico have, in general, accepted the Dependents' Medical Care Program. Some physicians believe that the Program represents a form of socialized medicine and have brought this impression to the forefront in our negotiations and in certain articles which have been written and published. Many of the physicians dislike Government intervention of any kind. They consider this Program as Governmental intervention in the practice of medicine, but even these phy-

* Hospitals, Journal of the American Hospital Association, 1 Aug. 1956, Table 13, Column 14 (Patient Income per patient day).

sicians realize that the reasons given for the institution of the Dependents' Medical Care Program are valid and that certainly something should be done for the service men and their families. In several states, physicians have never been confronted

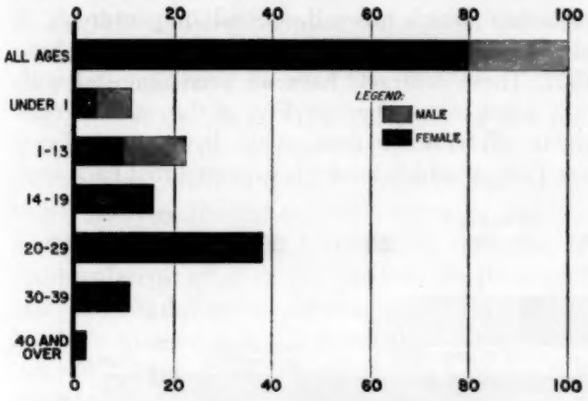

Chart 7.—Age and sex distribution of dependent patients. (Study on basis of 1,000 cases.)

with a service program as distinguished from an indemnity program on a scale as large as the Dependents' Medical Care Program. These physicians, in particular, voice their dissatisfaction on being told what their maximum fees should be in any given instance. They consider it one of the rights inherent in the private practice of medicine to determine what a patient should pay for a certain amount of care. Physicians traditionally object to "paper work," and our Fiscal Administrators receive many complaints about having to fill out the forms and have them accurate. Physicians, as a whole, do not like to turn to a manual to determine how much care can be rendered at Government expense for an acute emotional disorder or whether a scar can be taken from a woman's forehead if she applies to him for that attention under the Program. The Dependents' Medical Care Program has certain limitations on the care of nervous and mental diseases, elective surgery conditions, and chronic conditions and diseases. Some claims for service rendered have had to be denied because of the limitations of the Program and these denials sometimes invoke caustic comments from the physicians concerned. Physicians as a whole, however, are participating admirably in rendering care to eligible dependents of the Uniformed Services. This is indicated by the fact that 127,902 claims were received from physicians during the period of this report (Table 2). No complaint has been received from any dependent that a civilian physician refused to furnish care authorized by the Dependents' Medical Care Act.

b. By Hospitals: It can be stated that the Program has been universally accepted and somewhat widely acclaimed by civilian hospitals. It has been learned through many contacts, both personal and through the medium of correspondence, that many hospital officials are highly pleased with the Program and the manner in which it is being administered. Some have made representations for lowering of the requirements for participation, as outlined in the Joint Directive under the definition of hospital, but it is both interesting and gratifying to know that a number of hospitals have taken necessary action to permit their participation in the Program.

c. By the Dependent: In an effort to learn of the reactions of dependents to the Program, approximately 75 questionnaires are being sent out each

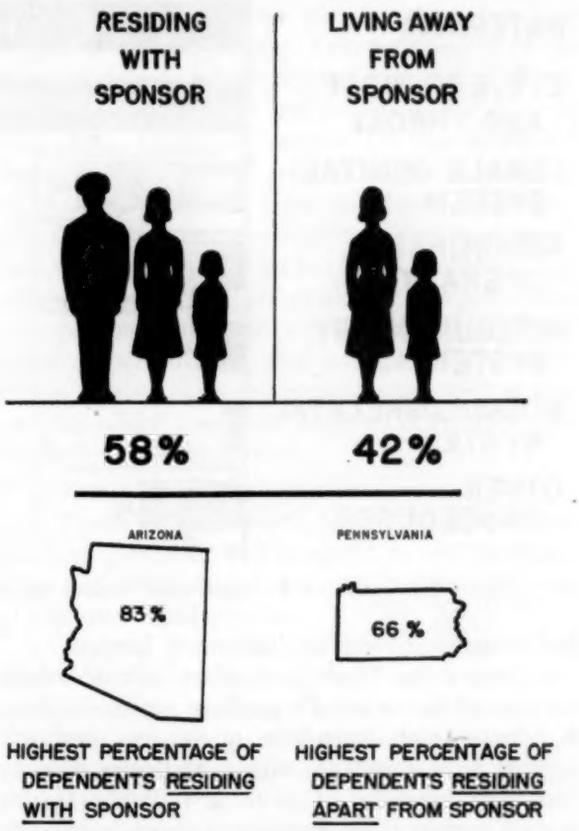

Chart 8.—Percentage of patients residing with and not residing with sponsors. (Study on basis of 5,000 cases.)

month to dependents representing the seven Services in widely distributed geographical areas who, since the Program became effective, have availed themselves of civilian care. Approximately 75% of all questionnaires have been returned and, without exception, all have indicated that they were general-

ly satisfied with the care received. Many were highly laudatory in their comments, making such statements as: "I have no complaints whatsoever to make. The doctors, hospitals, and nurses were wonderful. All I have is praise." "Service was good in all respects. I was very pleased and think the Medicare Program is one of the nicest things the Service has done to help dependents." The only criticisms received relate to the scope of the care provided. Lack of dental care and outpatient care are most prominently mentioned.

and Public Health Service both indicate that the Program has been well received and accepted by their personnel.

7. *Prospects for the Future*

a. Contract Extensions and Future Negotiations: All of the contracts for both hospitals and physicians payments which were described in paragraph 3, above, were originally negotiated to end 30 June 1957. These contracts have all been renewed with only a few minor changes. Five of the renewed contracts will terminate each month, beginning in January 1958, at which time it is expected that each con-

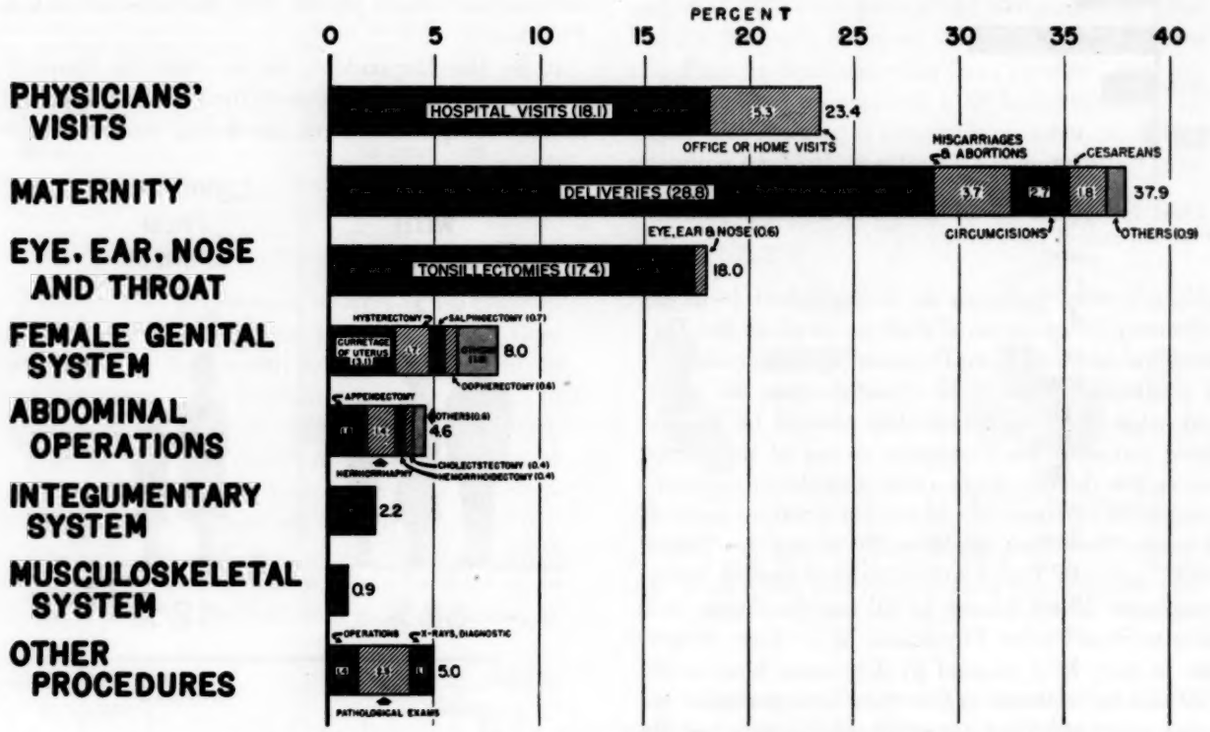

Chart 9.—Distribution of cases by diagnosis. (Based on study of 5,000 cases.)

6. *Noticeable Effects on Uniformed Services*

a. Impact on Medical Services: The Medical Services of the Armed Forces have reported a drop in admission of dependents to Services' hospitals ranging from 6 to 12% with a particular drop in maternity deliveries of 15 to 21%. Public Health Service reports slight increase of dependents in its hospitals because of authorization in law for Armed Forces dependents to be admitted. This Service also has had a drop in its Obstetric Services. Army, Air Force and Public Health Service all report the elimination of Dental Care for dependents by the Law is creating dissatisfaction.

b. Morale Influence: All services indicate this factor is difficult to determine but the Air Force

tract will again be negotiated. This staggering of negotiations (five a month, January through November 1958) will enable negotiations with all contractors to be accomplished by the same Government contract team and thereby minimize variations and inconsistencies between contracts.

b. Fee Schedule Revision: Experience has shown that a number of revisions are needed in the Schedule of Allowances for payment of physicians' fees. In many instances the diagnostic nomenclature is not clear to all physicians. The amount of pre and post-operative care which is considered normal in some areas is not normal in other areas. There is need for special explanations and delineations of these and other items in the Schedule and this will

be done as rapidly as experience brings these matters to the forefront. At the present time, the Office for Dependents' Medical Care is working with certain of the specialty groups in the medical profession in an effort to correct discrepancies.

c. Claim Form Revision: Efforts are being made to simplify and improve the claim form. All contractors have been asked to submit any suggestions they may have.

d. Dental Coverage: The Secretary of Defense has authorized the Executive Director, Office for Dependents' Medical Care Program to make a detailed study of the entire dental coverage problem for Service dependents. A committee consisting of representatives of all of the Services plus insurance and American Dental Association representatives has been appointed and is currently actively studying this matter. From this committee's report, it is hoped that substantial decisions as to future course can be derived.

e. Indemnity Coverage: At its annual meeting in New York City on 3-7 June 1957, the House of Delegates of the American Medical Association passed a resolution urging the Board of Trustees of the American Medical Association to request the Secretary of Defense "to modify the Medicare Program, regulations, and Directives so that the Program could be operated as an indemnity type Program where desired by individual states." The Program to date has been operated on a full service concept as prescribed in the Joint Directive and mentioned in paragraph 3, above. Studies will have to be conducted to evaluate the two types of coverage for decision at an appropriate time.

f. Fraud: To date there have been only three cases of possible fraud reported to the Office for Dependents' Medical Care. These cases are all being investigated by proper Government agencies. Many of the contractors have fraud detection means in force in their normal business. These methods are being utilized in their operation of the Dependents' Medical Care Program. As the Program progresses, however, it is possible that fraud attempts may increase and all concerned with the administration of the Dependents' Medical Care Program are being urged to be alert continuously to the possibilities of fraud and to present them for proper investigation and adjudication whenever they arise.

g. Group Pressures: The Office for Dependents' Medical Care has been contacted by several groups desiring to be included as eligible for payments under the Departments' Medical Care Program. Notable, are the chiropodists who feel that they should be eligible to practice their specialty in their own right under the Dependents' Medical Care Program and be eligible to receive direct payments. There are many doctors of osteopathy in the nation who have limited licenses to practice one specialty, principally obstetrics. This group has indicated that it should be included as eligible to receive payments under the Program. The pharmaceutical societies have made representation of their desire to have the Program include a method for paying pharmacists directly when physicians prescribe drugs for full maternity care. It is possible that these groups and others may make strong representation to the Defense Department and to the Congress for their inclusion in the Program.

h. Extensions of Program: It is known that one bill at least has been introduced into the Congress to provide for extension of the Dependents' Medical Care Program to include certain retired members of the uniformed services. Other extensions of the Program have been suggested, one being that it should include parents and parents-in-law of members of the uniformed services for care in civilian facilities. Provisions for greater dental care coverage in civilian facilities is often mentioned. Many feel also that more extensive outpatient care for dependents should be authorized in civilian facilities. They point out that if this were available some procedures now requiring hospitalization might be performed on an outpatient basis, thus saving the Government money. These items are merely mentioned as suggestions which have been received in the Office for Dependents' Medical Care.

8. *Conclusions*

a. That the Dependents' Medical Care Program has been generally well accepted by civilian physicians and civilian hospitals as well as the dependents of the uniformed services.

b. That the Program is reaching many dependents who would otherwise have been unable to receive medical care in uniformed service facilities.

c. That the Program is widespread and has reached many physicians and hospitals in its first 7 months.

d. That considerable study is required before many of the administrative problems being encountered can be resolved and before recommendations are made concerning extensions of the Program.

9. *Recommendations*

That the Dependents' Medical Care Program be continued as at present until studies and experience indicate that modifications are timely and appropriate.

CORRESPONDENCE

MEDICAL CARE PROGRAM, U. M. W. A. WELFARE AND RETIREMENT FUND

To the Editor:—I believe it would be of genuine interest to many members of the American Medical Association to read the statement which I presented to the Reference Committee on Miscellaneous Business on June 5, 1957, at the time it was considering the "Suggested Guides." This statement, which will make my position honestly known to everyone, is as follows:

In consideration of the numerous references to the medical care program of the U. M. W. A. Welfare and Retirement Fund which have appeared in medical journals, the public press and elsewhere, the following information is presented:

The task of providing medical care for the miners and their families was assumed by the Fund in 1948 because the unnecessary suffering, disability and preventable deaths due to inadequate medical care, or none at all, were shocking to all who knew the facts. The report of a Medical Survey of the Bituminous Coal Industry, conducted under Government auspices in 1946, contains the statement that in some of the mining communities provisions for health are "so poor that their tolerance is a disgrace to a nation to which the world looks for pattern and guidance."

It was sought from the beginning to enlist the understanding and cooperation of organized medicine at the national, state and local levels. All that we asked, or have ever asked, is that a good quality of medical care be provided for a potential of approximately a million beneficiaries at a cost that is reasonable and just as determined by the medical profession itself. It is generally agreed that the Fund has the right to expect good medical care for its beneficiaries at reasonable cost, and that organized medicine has an obligation to help in bringing this about.

The Medical Service of the Fund assured the profession of its concurrence in the principle of free-choice-of-physician and payment on a fee-for-service basis. Neither the physicians who were to render the service, nor the Fund which was to pay them, could foresee all of the problems that would arise nor the adjustments that might be necessary in providing solutions. It was the fervent hope, however, that organized medicine and the Medical Service of the Fund, working together in a united effort, could iron out whatever difficulties might be encountered and develop a pattern of medical care that would insure far better results than could be obtained by any other means, and serve as a model that others might follow.

While the majority of the 6,800 physicians who are receiving upward of $17,000,000 a year in payment by the Fund have rendered high grade, conscientious service under conditions of mutual confidence and satisfaction, there are those who, for lack of qualification for the work they have undertaken, or for other reasons, have not. In consequence, both the beneficiaries and the finances of the Fund have suffered greatly from unnecessary surgery, unnecessary hospital admissions, excessive length of stay of hospitalized patients, and services of inferior quality often resulting in duplication of treatment and costs at a later date.

The presentation of these facts to state and county medical societies, hospital staffs and individual physicians has, with few exceptions, resulted in little, if any, improvement. In our experience county medical societies and hospital staffs are too often reluctant to supervise their colleagues and effect the drastic changes in local practices and patterns of care that should be made. It is furthermore impracticable for representatives of the Fund to take specific action against physicians suspected of being responsible for such abuses unless they are so flagrant as to be readily apparent from statistical evidence that can be adduced.

As a means of lessening these difficulties the Fund adopted a provision that, as far as practicable, and except in emergency cases, all beneficiary patients would be seen in consultation with an appropriate specialist to decide upon the necessity of hospitalization before they could be admitted and treated at Fund expense. The resulting reductions in the rate of surgical operations and hospital admissions were in some instances from 30 to 50 per cent, and the advantages to the patient of specialist consultation were found to be considerable.

This requirement, however, was bitterly opposed by the medical societies in several states and was largely discontinued in the face of disapproval by resolution of the House of Delegates of the American Medical Association at its meeting in June, 1955.

Immediately following this action the Committee on Medical Economics of the Medical Society of the State of Pennsylvania and representatives of the Medical Service of the Fund engaged in a series of friendly and constructive conferences designed to establish better working relationships between physicians in the coal mine areas and the medical program of the Fund. After much concentrated effort an agreement on working principles was finally reached and signed by the Board of Trustees of the Medical Society of the State of Pennsylvania and

the Medical Service of the Fund. It became effective Jan. 1, 1956, and was published in full in THE JOURNAL of the American Medical Association, issue of May 12, 1956, with a commendatory editorial from which the following paragraph is quoted:

> It is the culmination of months of consultation and conference, and the efforts of the medical society and the results of these efforts can be commended to the attention and study of all who wish to improve relations between medicine and employer or employee groups.

On Oct. 23, 1956, the agreement was declared "null and void, terminated and ended" by action of the House of Delegates of the Medical Society of the State of Pennsylvania. No arguments were presented and no reasons were stated.

The foregoing efforts to attain its sole objective of providing good medical care for its beneficiaries, at fair and reasonable cost, having come to naught, the Medical Service of the Fund adopted other means for achieving, in part at least, its purpose. In surgical cases, for example, it has proven in the interest of the beneficiaries to have the surgery performed by broadly competent and responsible surgeons according to criteria established by the American Board of Surgery, the American College of Surgeons, or other agency similarly qualified to pass judgment on the education and training of broadly competent and responsible surgeons. This is an indication that their technical ability is above the average and that their surgical judgment, which some consider more important, is keen and sound. It is the purpose of the Fund, therefore, to utilize as far as practicable the services of surgeons whose qualifications are thus established, in preference to the services of physicians whose qualifications for surgery the Fund is not in position to judge.

This further effort to insure a high quality of medical care for its beneficiaries and reduce the cost of unnecessary hospitalization and surgery is again encountering the violent opposition of certain segments of organized medicine, with the assertion that the Fund is thereby lowering the quality of medical care to the patient, is discriminating unfairly and interfering with the free choice of physician.

With the overthrow of the agreement worked out with the Committee on Medical Eeconomics and approved by the Board of Trustees of the Medical Society of the State of Pennsylvania, there followed a rash of vituperative, unsubstantiated and misleading statements and articles in the publications of certain medical organizations, in the public press and elsewhere, together with resolutions and actions by certain county medical societies which are questionable as to their ethics and legality; also circular letters to local medical society members urging them to break their good relations with the Fund, and threats of local medical society discipline of any who do not. The hackneyed charge of "socialized medicine," and the absurdity of the statement that the Medical Service of the Fund is conniving to get control of the hospitals of this country by infiltrating highly qualified physicians, whom the miners like, are examples of the tactics being used.

Were it possible to insure a thorough, carefully planned and impartial investigation of the factors underlying these and other destructive actions and make the findings known to every member of the medical profession and the public at large, it is our firm conviction that most of the difficulties in providing good medical care for our people would cease to exist. The Medical Service of the Fund would cooperate most heartily in such an undertaking, which would doubtless prove of inestimable value to others concerned with problems of similar nature.

Any thoughtful person in full possession of the facts would know that with the investment the Fund has made in medical care for its beneficiaries the program cannot stop; it must go on. Petty persecutions, such as those by certain county medical societies which endeavor to prevent the Fund from providing medical care for its beneficiaries by denying membership in the county medical society to physicians who do so, will be settled by legal means if other measures fail. Other petty forms of persecution have already failed.

The program is now in its ninth year of operation. Most of the physicians who have served the Fund desire to continue to do so, free from intimidation by others who, through lack of understanding or for selfish reasons, are constantly pressing for destructive measures while carefully avoiding a searching inquiry which would reveal the facts *in toto*.

It is the steadfast desire of the Medical Service of the Fund to maintain the friendly understanding and cooperative relationships which have always existed with the fairminded members of the medical profession who have understood the spirit and intent with which the program has been conceived and carried out. They do not deny that it is the right of the Fund, as it is the right of others, to determine the services for which it will pay, and the physicians who will render them. They realize also that it is the obligation of the Trust Fund to control and administer its own program with the greatest efficiency and economy possible. While exercising this right and fulfilling this obligation, we shall continue our endeavor to work in harmony and cooperation with the medical profession to serve the best interests of the patient, which is the primary purpose to which we all are dedicated.

WARREN F. DRAPER
Executive Medical Officer
Welfare and Retirement Fund
United Mine Workers of America
907 15th St. N.W.
Washington 5, D. C.

MEDICAL LIFE IN TAIWAN

To the Editor:—Having just read the article, "American Medicine Abroad—Hong Kong," by Lou Hazam, in the Aug. 24 issue of THE JOURNAL, page 1968, I am prompted to write. Because the itinerary of the "March of Medicine" production team, sponsored by Smith, Kline & French Laboratories, is so near to Taiwan (Free China), we wish you could even now include this field of medical work in that story. The 35-bed hospital here, located very near the ocean, with a backdrop of "straight-up" mountains, is unique in that it is the only one serving the 150,000 mountain people, the aborigines of the island. Many walk days to get help, patients are often brought

1. Mountain people, Taiyal Tribe—Hualien, Taiwan.

long distances on the backs of relatives—it is a daily picture. They are the most needy, living still very close to their original ways, colorful and interesting, having given up headhunting and tattooing of the face only recently.

We have been here now one and a half years but find the work continuously challenging. We enjoyed the story of the Isle of Happy Healing very much and intend to visit there soon—missed it our last time in Hong Kong because of bad weather. We hope you can include this (our) area on your informative production, not for a minute because of our connection but because it is about as fascinating as one can imagine. Our best wishes in your project of "telling" what is being done; we con-

2. Mountain people of Amis Tribe—Hualien.

stantly feel that "we cannot do enough!" We wish we could help to initiate a pure food and drug act here!

We are most fortunate in having Marcy Ditmanson, M.D. (University of Minnesota, 1951), to help with the usual and the unusual. He is planning to set up another hospital hopefully for the mountain people, if possible.

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Director, MC Hospital
No. 19, Lane 45 N. Chung Shan Road
P. O. Box 508
Taipai, Taiwan.

3. Mountain people of Taiyal Tribe: nurse, patient, and mother with tattoo on face.

AIR TRAVEL

To the Editor:—In THE JOURNAL of Sept. 21, 1957, the first article "The Physician's Role in Air Travel" by Dr. F. S. Spiegel, page 205, warrants comment. In general, the article is very well written, and very timely for physician advice to patients traveling by commercial airlines. However, several statements in the body of the article are at variance with the experience of medical men connected with commercial air travel.

The statement is made that infants under 6 weeks of age are usually not transported by commercial carriers unless there are very extenuating circumstances. This has never been so within commercial airlines in the United States. While it is true that, in the early days of air travel, we restricted infants below 14 days of age from traveling in nonpressurized aircraft, we have gradually lowered this requirement so that medical directors of most of the certificated commercial airlines have issued directives that infants above 7 days of age may travel without any restrictions. We are still of the opinion that infants below 7 days of age may not have a definite, set respiratory pattern and may get into difficulty while breathing air slightly above the earth's surface, such as is found even in pressurized cabins, which are pressurized to approximately 8,000 ft. of altitude.

We are also not in agreement with the statement that children are only "fair" air travelers, as stated in this article, and that the incidence of airsickness and ear trouble is greatest in those under 5 years of age, 5 to 10 times more frequent than in adults. In fact, the figures we have obtained on air travel in the general population are to the effect that children are usually better travelers than adults. They have less ear difficulty because the eustachian tube is larger and not as tortuous and a good lusty cry or yell will usually serve to aerate the ears, whereas in adults there may be more difficulty.

The statement is also made that the female is more prone to develop motion sickness in air travel, at a rate five times the rate encountered in males. While it is true that the adult female is more susceptible, our figures show that she is approximately three times as susceptible as the male. We are also not in agreement with the statement that this is in all probability due to anxiety and apprehension, but, rather, we feel that the lack of exposure to motion in general is what accounts for the high rate of motion sickness in adult females.

With respect to passengers recovering from recent coronary thrombotic episodes, it is a standing rule within airline medical departments that coronary patients may travel approximately six weeks from the time of incurrence of an average infarct. In fact, our criterion is that, if the patient is able to climb one flight of steps unassisted and is not in any degree of failure, he is an excellent air passenger. The statement made on page 207 in this article, "It is not unusual for a commercial airliner to make an emergency stop at an en route airport to place a passenger in the care of a physician" should read "It is unusual. . . ."

The medical criteria for air passengers in general have been enumerated in an article published in *Current Therapy* in 1951, which was a symposium by the various airline medical directors in collaboration. In general, Spiegel's article is very excellently written and should be timely information to the general practitioner in giving good, sane advice to his patients as passengers.

LUDWIG G. LEDERER, M.D., Ph.D.
Medical Director, Capital Airlines, Inc.
Chairman, Medical Committee,
Air Transport Association
Washington National Airport
Washington 1, D. C.

MEDICAL HISTORY

To the Editor:—The International College of Surgeons has established at its headquarters in Chicago a Hall of Fame in which the history of medicine in various parts of the world is revealed. Various rooms are dedicated to the portraying of surgical and medical history, each room being supported by the government or physicians in a country. In the museum and its Hall of Fame are objects depicting many aspects of world medical history. Thus one can see a crude but operable x-ray device nearly half a century old, the original model of the Carrel-Lindbergh artificial heart, trephined skulls from Peru more than 3,000 years old, Florence Nightingale's nurse cap and 75 of her letters, surgical instruments of all eras, and actual penned reports of Freud, Pasteur, Curie, and other medical greats. Then there is a Hall of Murals portraying successive achievements of the healing arts from antiquity to the modern age, and in the Hall of Immortals are life-sized sculptures of such forerunners of modern surgical science as Imhotep, Hippocrates, Galen, Ambroise Paré, Vesalius, William Harvey, Morgagni, Louis Pasteur, Semmelweis, Lister, Röntgen, and Marie Curie. Thirty nations have rooms they have furnished with exhibits highlighting their own contributions to medicine, and others are investigating what they can contribute. There are, however, many items that members of the medical profession have in their own possession but would like to have assembled in a medical museum. To these an invitation is extended to send such memorabilia to the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10. The donors of articles will be acknowledged by appropriate labels on the articles presented.

MAX THOREK, M.D.
International Secretary General
International College of Surgeons
Chicago 10.

RETIREMENT

To the Editor:—I read with interest the recent article appearing in THE JOURNAL, July 27, 1957, page 1477, entitled "Medicine's Biggest Battle: Taming Time." Much of what was written was to the point and pertinent. I have some questions about the discussion following the section entitled What About Retirement. The aim is in the correct direction, but the target, I feel, is not the right one. Let me make my point by using the partial sentence: ". . . how essential it is for elderly patients to retain the status and worth-whileness which comes with regular employment."

Is retirement the real problem? Does the adding of life to years depend upon remaining in the business world? I think not.

Today we face the problems produced by the later years, life after the age of 65. It is wrong to consider this phase as part of adulthood. Much of what was done in the earlier years was in preparation for adulthood. We shortchange ourselves when we equate "status and worth-whileness" in the later years with regular employment. The later years can be a period of "growth, motivation, and fulfillment." We err when we inflate the importance of retirement and the necessity of continued work. Rather, those over 65 years of age should be prepared at this point for a life with other goals, other values, other meanings, other enjoyments, other satisfactions. All of these are the result of having lived this long with adequate preparation to meet this phase of life. It is now when one can begin to answer the basic question: What is life? What does life mean to me? Too much effort is made to impress upon the later years the values of the earlier years. The retailoring of adulthood to fit the later years only results in a misfit. The later years allow for living through inner stimulation and the latter only develops with adequate preparation.

It is rare to find the adult preparing for the later years. This is why retirement after 65 is so horrifying.

Life after 65 can have greater depth than the satisfaction derived from a 40-hour a week job. There is the possibility of further growth, many useful roles, and a greater sense of life-fulfillment than the stretching of the mundane values of adulthood. I will agree that, if the only satisfaction a capable man can receive in life is the continuance of his employment, he should continue this. But we in medicine must continue "to help bring growth, motivation, and fulfillment to a larger majority of the population" by helping them to recognize a full life; ". . . we must begin to see the aging of the population as an achievement which has created an opportunity to be grasped, rather than as a set of problems to be solved along humdrum lines" (Aging in the Modern World, Ann Arbor, Mich., University of Michigan Press).

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LAW DEPARTMENT

MEDICOLEGAL ABSTRACTS

Privileged Communications: Right of Opposing Counsel to Comment to Jury Concerning Exercise of Privilege.—This was an action for damages for injuries alleged to have been caused by an automobile accident. From a judgment in favor of the defendant, the plaintiff appealed to the Supreme Court of Minnesota.

After the accident occurred, the plaintiff did not think she was injured and drove on home with her husband. The following day she felt stiff and sore and had headaches and pain in the lower part of her back. She was 42 years of age, weighed 163 lb., and was 5 ft. 2 in. tall. She had been pregnant seven times, three of which pregnancies resulted in miscarriages. One miscarriage occurred shortly after the collision, but it is conceded that the collision had no connection therewith. Prior to the accident, the plaintiff had received treatment for various things at the Mankato Clinic and sometime after the collision she saw the clinic doctor who had been her family physician for a number of years and told him that she was having backaches and that she had been in an automobile collision. On the first day of the trial, which was about two and one-half years after the accident, the plaintiff was examined by a specialist in surgery from Minneapolis, who subsequently testified that she had suffered a prolapsed intervertebral disk as a result of the collision. This specialist was the only medical witness who testified on the plaintiff's behalf. She did not call any of the attending physicians or the doctors who had treated her prior to the accident and subsequent thereto. In fact, she exercised her statutory privilege in connection with such physicians so that the defendant was unable to call them either.

During his argument to the jury, the attorney for the plaintiff attempted to leave the impression with the jury that the failure to call the attending physician and to procure the records of the Mankato Clinic was attributable to the defendant's counsel. Therefore the defendant's counsel, in his argument, referred on several occasions to his inability to produce the doctors who had attended

the plaintiff prior to the collision and emphasized that such failure was due solely to the fact that the plaintiff had exercised her statutory privilege. On appeal, the plaintiff contended that it was prejudicial error to permit the defendant's counsel to refer to the plaintiff's assertion of the privilege in his argument to the jury.

The Minnesota statutes provide "A licensed physician or surgeon shall not, without the consent of his patient, be allowed to disclose any information or any opinion based thereon which he acquired in attending the patient in a professional capacity, and which was necessary to enable him to act in that capacity . . ."

The Supreme Court said that there probably is no privilege in the field of evidence so abused as the physician-patient privilege. The purpose of the statute was to encourage full disclosure by a patient to his physician by prohibiting the physician from disclosing the information of a confidential nature which he obtained. The basis of the privilege was the confidential nature of the communication. Instead of accomplishing the purpose for which it was originally intended, said the court, the privilege has been so far corrupted today that it is used, at least in personal injury cases, for the most part for the suppression of the truth. In his treatise on evidence, McCormick says: ". . . More than a century of experience with the statutes [dealing with physician-patient privilege] has demonstrated that the privilege in the main operates not as the shield of privacy but as the protector of fraud." We intend to cast no reflection on use of the privilege in this case by the counsel for the plaintiff, said the Supreme Court. Throughout the years the privilege has been converted into a strategic device for the exclusion of evidence apt to be harmful to the case of the party having control of the evidence. As long as such use is approved, tacitly or directly, by the courts, it can easily be understood that the counsel for a party litigant will avail himself of the right to use it to the best advantage for his client. He can hardly be criticized for so doing.

As far as the statute goes, continued the court, it creates a right with which the courts cannot interfere. This case poses the question: How far shall the courts go in protecting an unfair advantage procured by one party to a lawsuit against his adversary by virtue of the privilege where plaintiff sues to recover for personal injuries and at the same time asserts the privilege which, theoretically at least, will keep secret the very injuries for which he seeks to recover damages? Under these circumstances, shall the court permit the jury to infer, if it chooses to do so, that his adversary was responsible for not producing the attending physician, or is it more in line with the administration of justice to put the blame where it belongs—on the party asserting the privilege?

The court then discussed some of its prior decisions in connection with the husband-wife privilege and stated that, in a civil case, if one of the parties insists upon his privilege to exclude testimony that would throw light upon the merits of the case and the truth of his testimony, we are of the opinion that it is a proper subject for comment to the jury.

Of course, said the court, the above is true where the privilege is asserted for the purpose of keeping secret the information acquired by the doctor in examining or treating the patient, but can the facts learned by the doctor be kept secret when plaintiff sues to recover for the very injuries he claims a right to keep secret? It is then incumbent upon the plaintiff to prove the nature and extent of his injuries. In doing so, he cannot at the same time keep secret the nature and extent thereof. As far as the statute gives him a right to close the mouth of the doctor we cannot interfere. And as long as the privilege is asserted for the purpose for which it was created, it should be given full respect. But when it is asserted for the sole purpose of gaining a strategic advantage over an opponent and accomplishes nothing pertinent to the purpose for which it was created, it should not be further extended by judicial decision. If it is so used, it is only fair that the jury be permitted to know who was responsible for keeping out the evidence most likely to establish the truth. The blame, in that case, should be put where it belongs, not left so that the jury can, perchance, accuse the wrong party of failing to call the doctor. We therefore now hold, concluded the Supreme Court, that, when a physician-patient privilege is asserted by a party to an action seeking recovery for personal injuries and the nature and extent of the injuries are involved, it is not error to permit fair comment to the jury by the adverse party on his inability to examine such attending physician concerning his examination and treatment of the patient.

The plaintiff's other contentions were also overruled and the judgment in favor of the defendant was affirmed. *Nelson v. Ackermann, 83 N.W. (2) 500 (Minnesota, 1957).*

Revocation of License for Associating in the Practice of Medicine with an Unlicensed Person.—This was a proceeding to review an order revoking the license of the petitioner. The trial court affirmed the order of the State Board of Medical Examiners, so the petitioner appealed to the court of civil appeals of Texas.

The evidence showed that the Hoxey Cancer Clinic was owned by Harry M. Hoxey and his wife, neither of whom are licensed to practice medicine. No medical doctor owned any interest in the clinic. For a period of time in 1955 the petitioner was em-

ployed by the clinic as its radiologist. The fees charged for his services were collected by the business office of the clinic. The petitioner was paid a straight monthly salary in return for his services, and the clinic retained any money received over and above that amount. The Texas Medical Practice Act authorizes the forfeiture of a license to practice for "(12) The impersonation of a licensed practitioner, or permitting, or allowing, another to use his license, or certificate to practice medicine in this State, for the purpose of treating, or offering to treat sick, injured, or afflicted human beings" or "(13) Employing, directly or indirectly, any person whose license to practice medicine has been suspended, or association in the practice of medicine with any person or persons whose license to practice medicine has been suspended, or any person who has been convicted of the unlawful practice of medicine in Texas or elsewhere."

The court of appeals said that it could see no distinction between the facts of this case and the facts of *Rockett* v. *Texas State Board of Medical Examiners (287 S. W. [2] 190)*. On the point in issue, the court said in that case:

> Appellant was employed by Thomas Clinic for a salary of $500 per month and he received no fees; the Clinic was owned by Ralph C. Thomas, who was not a medical doctor and no medical doctor owned an interest in the clinic; appellant performed medical services for the clinic and the fees for such services were collected by the clinic. Such conduct on the part of appellant was in effect "permitting or allowing another to use his license or certificate to practice medicine in this state, for the purpose of treating or offering to treat such, injured, or afflicted human beings," which conduct is prohibited . . . and is made ground for the forfeiture of a license to practice medicine.

Accordingly the order of the Board canceling the petitioner's license was affirmed. *Watt v. Texas State Board of Medical Examiners, 303 S. W. (2) 884 (Texas, 1957).*

Insanity as a Defense in Criminal Cases: The Durham Rule or the McNaghten Rule in Illinois.—This was a prosecution for the murder of a police officer in which the defendant was found guilty and took an appeal to the Supreme Court of Illinois.

The sole defense was insanity and the defendant's principal assignment of error related to three instructions which the trial court gave on the subject. One of these instructions set forth the so-called irresistible impulse test. The other two set forth the "right and wrong" test and pointed out that to be insane the defendant must not only not know the difference between right and wrong but must also, if he does know the difference, be unable to choose between them and to control his action accordingly. These instructions were admittedly in accord with previous expressions of the Supreme Court, but the defendant argued that they are unsound and should be abandoned. The instruction which he tendered in their stead was adapted from the recent decision of the Court of Appeals for the District of Columbia in *Durham* v. *United States (214 F [2d] 862)*.

It is extremely difficult, said the Supreme Court of Illinois, to formulate principles delineating when and to what extent a mental disease or defect so reduces the voluntariness of an accused's act as to exclude responsibility for that act, and even more difficult to apply those principles in concrete cases. The leading common-law decision is McNaghten's case, and with subsequent modifications the rules there enunciated make up the bulk of the law on this subject. Of these rules, the most important was that which has become known as the "right and wrong" test. It follows: ". . . to establish a defense on the grounds of insanity, it must be clearly proved that, at the time of the committing of the act, the party accused was labouring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act he was doing; or, if he did know it, that he did not know he was doing what was wrong." Objections to this test were voiced early. It is said that the rule fails to recognize the situation where one knows it is wrong to do a certain act but because of mental illness is not able to control his actions accordingly. Such criticism is wide of the mark in this case, continued the court, because the courts in Illinois do not rely solely upon the "right and wrong" test. "The mere ability to distinguish right from wrong is not the correct test—the accused must also be mentally capable of choosing either to do or not do the act, and of governing his conduct in accordance with such choice." According to the instructions given by the trial court, there is no responsibility for one even if he knows the difference between right and wrong if he is not "capable of choosing either to do or not to do the act or acts constituting such crime or of governing his conduct in accordance with such choice." This common thread of excusing conduct over which the accused has no control, the court continued, is also present in the so-called irresistible impulse test which Illinois, and an apparent minority of other jurisdictions, expressly recognizes. Here again the defendant charges that there is undue recognition of the intellectual faculty. However, a reading of the instruction discloses that this is not true. Under this instruction there is no criminal responsibility if the "unsoundness of mind" or "affliction of insanity" was of such a degree "as to create an uncontrollable impulse to do the act charged by overriding the reason and judgment and obliterating the sense of right or wrong as to the particular act done or depriving the accused of the power of choosing between right and wrong."

In short, concluded the court, the instructions given in this case are not subject to the criticism lodged against them.

The defendant still maintained that his instruction, adapted from the Durham Case, should have been given. In that case, the court considered this general problem at length and concluded that the "existing tests of criminal responsibility" in the District of Columbia were "obsolete and should be superseded." In its opinion a sound test, cast in the form of a jury instruction, could be stated in substantially the following language:

> If you the jury believe beyond a reasonable doubt that the accused was not suffering from a diseased or defective mental condition at the time he committed the criminal act charged, you may find him guilty. If you believe he was suffering from a diseased or defective mental condition when he committed the act, but believe beyond a reasonable doubt that the act was not the product of such mental abnormality, you may find him guilty. Unless you believe beyond a reasonable doubt either that he (the defendant) was not suffering from a diseased or defective mental condition, or that the act was not the product of such abnormality, you must find the accused not guilty by reason of insanity. Thus your task would not be completed upon finding, if you did find, that the accused suffered from a mental disease or defect. He would still be responsible for his unlawful act if there was no causal connection between such mental abnormality and the act. These questions must be determined by you from the facts which you find to be fairly deducible from the testimony and the evidence in this case.

From the substantive standpoint, said the court, there does not seem to be any significant difference between this instruction and the instructions given by the trial court, especially as the instructions would be understood by the ordinary jury. Both tests recognize that criminal responsibility must take account of impairment of the will, as well as impairment of the intellect. If anything, the court added, the given instructions are the more explicit, articulate, and useful. In the refused instruction, the words "disease," "defect," and "product" are left undefined, and, on the whole, the instruction is vague and ambiguous. Observing this, one writer concluded that "Durham then puts forth, in my opinion, a legal principle beclouded by a central ambiguity, both unexplained and unsupported by its basic rationale." The need in this area is for more clarification, and the Durham instruction does not supply it. Justice Learned Hand put it this way: "I have read the opinion that you mention, and perhaps it is all that can be said; but, frankly, it did not seem to me to give us any guidance that perceptibly would help."

The Supreme Court therefore concluded that the trial court did not commit error in the giving of its instructions. The judgment of conviction was affirmed. *People v. Carpenter, 142 N. E. (2d) 11, (Illinois, 1957).*

MEDICAL FILM REVIEWS

Safe Cerebro-electrotherapy: 16 mm., color, sound, showing time 15 minutes. Prepared by Theodore R. Robie, M.D., Orange, N. J. Produced in 1957 by Sturgis Grant Productions for and procurable on loan from Schering Corporation, Bloomfield, N. J.

In the introductory portions of this film, the author states that the customary techniques of electroshock, as presented in a scene likely to be judged medically repellant by many observers, produce spinal fractures and other serious complications. He therefore proposes that convulsive therapy be modified by (*a*) the preliminary injection of succinylcholine used as a mucle paralyzant, (*b*) a proprietary short-acting thiobarbiturate to dispel the resultant suffocation-anxiety, and (*c*) the passage of a rapidly increasing (glissando) voltage through the cranial electrodes. These procedures are illustrated in an obese female "depressive" and in a cathectic, asthmatic, senile patient. The script of the film is succinct, the sound clear, and the color photography good. However, there is hardly a statement about the indications, technique, or results of electroconvulsive therapy that would not be seriously challenged by authorities in the field, many of whom would consider particularly dangerous the assertion that this technique constitutes a safe office procedure. The film therefore should be presented to professional audiences only when accompanied by informed and critical commentary.

Techniques of Angiography: 16 mm., color, sound, showing time 15 minutes. Prepared in 1957 by and procurable on loan from Alfred W. Humphries, M.D., Cleveland Clinic, 2020 E. 93rd St., Cleveland 6.

This film is divided into two parts: the first demonstrates the techniques of aortography, and the second, the techniques of femoral arteriography. Both sections follow the same pattern of demonstration of equipment, demonstration of procedure by animation, demonstration of procedure in actual practice, illustrative angiograms, and a listing of the equipment required. Heavy emphasis is placed on x-ray equipment, techniques, and timing of exposures—the latter to such a degree that at one point the technician's hand, which holds the exposure switch, is brought into the area of high radiation intensity, in spite of present alarm concerning exposure of personnel to radiation. The techniques of inserting the aortic needle and the femoral artery catheter are clearly described, and the roentgenograms are excellent in quality and reproduction. The color, organization, and content of this film are all good, and the photography and art work are excellent. This film is recommended to all who are interested in the subject of angiography.

Mr. Finley's Feelings: 16 mm., color, sound, showing time 10 minutes. Produced in 1957 by and procurable on loan from Metropolitan Life Insurance Company, 1 Madison Ave., New York 10.

This animated film is designed to encourage discussion, to stimulate questions and comments, and to provoke an exchange of ideas about ways of meeting stress situations and handling day-to-day relationships with people. The principal character is Tom Finley, and although the viewers never see him, they become fairly well acquainted with him. Tom's emotional tensions get him and his associates into a variety of difficulties. The film prescribes no set rules for emotional health, but by the end of the film Tom has gained insight into his situation and has begun to see things more realistically. As stated by the producers, this film should be used only with a qualified discussion leader and should be previewed in advance to enable the discussion leader to become familiar with the content and to anticipate questions. Under these conditions, it can be recommended for showing to college and adult lay groups.

Complete Vaginal Repair: A Simplified Approach: 16 mm., color, sound, showing time 19 minutes. Prepared by Stanley F. Rogers, M.D., Jack Moore, M.D., and Warren Jacobs, M.D., Houston, Texas. Procurable on loan or purchase ($125) from Eaton Laboratories, Medical Film Division, Norwich, N. Y.

This film illustrates the surgical correction of cystourethrocele and rectocele accompanied by vaginal hysterectomy. The technique used is designed to simplify the procedure as much as possible. Emphasized also is repair of cystourethroceles and rectoceles. The accompanying vaginal hysterectomy is shown to be an incidental but very necessary part of the procedure if the best results are to be obtained. Included are colored drawings which help to show the points of anatomy and technique. The narration describes the purpose and technique of each step of the operation as it is performed. This is an excellent teaching film for the already accepted standard vaginal hysterectomy and repair procedure as outlined by Drs. Heany and Allen. The drawings are excellent, and the film as a whole is well produced. It can be recommended highly for showing to gynecologists, residents, and medical students.

Esophageal Atresia with Tracheo Esophageal Fistula: 16 mm., color, sound, showing time 14 minutes. Prepared in 1956 by and procurable on loan from Philip Thorek, M.D., 25 E. Washington St., Chicago 2.

By means of drawings and preoperative and postoperative roentgenograms, a very brief resume of the incidence, anatomy, and pathology of tracheoesophageal fistula and esophageal atresia is presented. The operative procedure is shown using the right posterolateral approach on 2-year-old infant. The procedure for an end-to-end anastomosis as well as an anastomosis over a T tube are presented in detail. Postoperative roentgenograms and pictures of the patient are presented. The surgical technique is excellent, and the film is very well organized. At the end of the picture the author states, "Our present thinking is that the T tube method is the method of choice in esophageal atresias and tracheoesophageal fistulas." This picture is recommended for surgeons who are interested in this surgical procedure. It will also be of value to pediatricians, house officers, and medical students.

NEW FILMS ADDED TO A. M. A. MOTION PICTURE LIBRARY

Dermatologic Office Procedures for the General Practitioner: 16 mm., color, sound, showing time 30 minutes. Prepared in 1956 by Gerald M. Frumess, M.D., Egbert I. Henschel, M.D., Henry M. Lewis, M.D., Denver. Procurable on loan (service charge $3) from Motion Picture Library, American Medical Association, 535 N. Dearborn St., Chicago 10.

The dermatological procedures that the physician may safely use in his office practice are shown objectively. These include electrosurgical and surgical removal of benign skin tumors, methods of biopsy, the use of solid carbon dioxide, patch testing, application of Unna's paste boot, and similar procedures. The photography and color are excellent. Although the sound track is not of the best quality, this film is very instructive and contains no repetition. It can be recommended for general practitioners, especially those in outlying districts, and for senior medical students.

The Motion Picture in Medical Education: 16 mm., color, sound, showing time 30 minutes. Produced in 1956 by the American Medical Association. Procurable on loan ($2) from Motion Picture Library, American Medical Association, 535 N. Dearborn St., Chicago 10.

Excerpts selected from many of the outstanding medical teaching films are included in this presentation to demonstrate the special qualities of the motion picture which make it a unique medium for teaching. This film shows the scope and flexibility of the motion picture as a means of presenting information and skills for learning purposes. The 25 sequences that were selected from existing films show a wide variety of filming techniques which make possible the reproduction of phenomena that are difficult, expensive, or dangerous to reproduce in other ways—such as the action of the mitral valve in situ. Good examples are also shown of experiences which are impossible to provide without the motion picture, i. e., normal circulation in the omentum of the rhesus monkey and ovulation in the rat, because only the time-lapse camera can speed up continuous motion to a point where such motion is discernible to the human eye. This film should be of great interest to medical educators. It is recommended for staff conferences, seminars, or institutes on teaching methods, not only to show the broad range of medical teaching films but also to stimulate greater use of the many excellent films now available.

MEDICAL LITERATURE ABSTRACTS

INTERNAL MEDICINE

Mavero-hepatic Icterus (Black Liver Jaundice). W. T. Bynum. Gastroenterology 33:97-103 (July) 1957 [Baltimore].

Nonhemolytic, nonobstructive jaundice has generally been identified as Gilbert's disease. There is much confusion in the literature with regard to nonobstructive, nonhemolytic jaundice. The author attempts to delineate Gilbert's disease and a new distinct clinical entity, as illustrated by a case history. This condition was first described by Mallory in 1943, and subsequently additional cases were observed by other investigators. The typical aspects were presented in a monograph by Dubin and Johnson in 1954. The 30-year-old man whose history is presented had all the characteristics presented by Dubin and Johnson but in addition had melanuria, which had not been reported before.

The author stresses the following as the salient features: (1) nonfunctioning gallbladder and normal extrahepatic biliary ducts; (2) vacillating serum bilirubin level with variations in the reacting fractions (this is an exception to the dogma that a vacillating bilirubin level is pathognomonic of common duct stones); (3) persistent melanuria, which contradicts the belief that melanuria is pathognomonic of melanosarcoma, usually with extensive liver invasion and hopeless prognosis; (4) varying liver function tests; and (5) ready corroboration of the diagnosis by the gross and microscopic findings, which are similar and characteristic. The biopsy material from the liver always shows a characteristic black, greenish-black, or brownish-black color. On microscopic examination the most striking diagnostic feature is the presence of innumerable dark brown pigment granules. Clinically the disease is a benign, chronic process, not disabling or productive of any distinguishing symptoms. Some patients have been followed for as long as 10 years, and there has been no progressive liver failure. This new entity has been confused with obstructive jaundice and chronic viral hepatitis, as well as with Gilbert's disease. These conditions, as well as others, can be excluded by the pathognomonic histological appearance of the liver in needle biopsy studies. It is important for internists, and particularly gastroenterologists, to be aware of this condition and to recognize its pathognomonic histological features in order to prevent erroneous diagnosis and unnecessary surgical procedures, as well as to assure the patient of a good prognosis.

Experimental Food-Poisoning by Clostridium Welchii. F. E. Dische and S. D. Elek. Lancet 2:71-74 (July 13) 1957 [London].

Three strains of heat-resistant type-A Clostridium welchii isolated in food poisoning outbreaks were used. The volunteers were 41 healthy adults aged 20 to 50, mainly medical students and medical staff. The preparations were added to the soup course of a luncheon. About 6 tests were done at a time, and controls consisting of sterile Robertson's medium were included, the subjects being kept in ignorance of the nature of the preparation they were receiving. After the meal they continued their normal activities and recorded any symptoms.

Cultures of a strain obtained originally from a food poisoning outbreak produced in most of the volunteers a short attack of diarrhea and abdominal pain after an incubation period of about 12 hours. The symptoms were identical with those in the naturally occurring outbreaks, and this is considered evidence that heat-resistant Cl. welchii type A can cause food poisoning. A second strain gave indefinite results, while a third appeared to be inactive. This fact suggests that virulence may be lost and may account for the negative findings of other workers. Bacterium-free culture filtrates and cultures which had been heated to 100 C did not produce symptoms, but positive results occurred with live cultures and suspensions. It appears probable that the illness is due to a mild transient infection. No significant rise in titer of circulating Cl. welchii alpha antitoxin could be demonstrated after an attack. Cl. welchii alpha toxin is unlikely to be concerned in the disease. Heat-resistant Cl. welchii spores were found in the stools of 97% of the volunteers after the feeding tests; of the controls, 15.6% excreted the organism. An apparent association between the hospital environment and a high carriage-rate was noted, but the explanation is obscure. An attack did not confer protection against a further attack. In circumstances where it is necessary to

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eat food that may contain Cl. welchii, infection is unlikely if the food is boiled shortly before consumption.

The Houssay Syndrome. R. J. Calvert and G. Caplin. Brit. M. J. **2**:71-74 (July 13) 1957 [London].

The Houssay animal (with both pancreas and anterior pituitary removed) exhibited diminished glycosuria, negligible ketosis, increased insulin sensitivity, survival for several months without insulin treatment, widely fluctuant glycemia, and a tendency to progressive undernutrition and to hypoglycemic episodes. The clinical counterpart, due to natural disease, excluding acromegaly and parapituitary tumors, termed the Houssay syndrome, is apparently rare, only 17 well-documented cases having been reported since Houssay's observations. The authors report one further case. The variable clinical pattern of hypopituitary coma includes 3 standard types—namely, pyrexial, hypothermic, and hypoglycemic—and a 4th miscellanous form. It is further characterized by no predilection to sex, a frequently ill-explained hypopituitarism, a high fatality rate, and a lack of specific clinical features. The recognition of the Houssay change is important, as once-safe insulin dosage may otherwise be fatal. Histological findings in the authors' patient included adenocarcinoma of the pancreas; extensive anterior pituitary necrosis; secondary carcinoma in the liver; and glomerular inflammation. For treatment, the judicious use of antibiotics is important and cautious insulin therapy and cortisone therapy are mandatory.

Diuretic Effect of Heparin, Particularly in Patients with the Nephrotic Syndrome. C. L. H. Majoor, H. Prenen, P. J. J. van Munster and R. J. A. F. M. Schlatmann, Nederl. tijdschr, geneesk. **101**:1301-1307 (July 13) 1957 (In Dutch) [Haarlem, Netherlands].

The intravenous injection of 300 mg. of heparin daily in a 22-year-old man with the nephrotic syndrome caused profuse water and sodium diuresis after corticotropin, prednisone, salt restriction, and mercurial diuretics had been practically ineffective in earlier therapeutic trials. Increased salt and water excretion was measurable after 36 hours and reached maximal values 96 hours after the onset of heparin therapy. After the heparin was withdrawn, the diuresis returned to pretreatment levels in about the same time. The administration of bishydroxycoumarin preparations did not produce a diuretic effect. The authors regard it as unlikely that the diuretic effect of heparin is the result of changes which this drug produces in the lipoproteins of the serum. Heparin treatment was followed by increased diuresis in another patient with the nephrotic syndrome, in a woman with edema caused probably by bilateral femoral thrombosis, and in a man with coronary insufficiency without heart failure. Detailed balance studies in this patient revealed slight potassium retention and an unusual type of nycturia, in addition to profuse sodium diuresis during heparin therapy. It is suggested that heparin induces these effects by suppressing the adrenal cortical function.

Oral Treatment of Subacute Bacterial Endocarditis with Phenoxymethyl Penicillin (Penicillin V). C. A. Santos-Buch, M. G. Koenig and D. E. Rogers. New England J. Med. **257**:249-257 (Aug. 8) 1957 [Boston].

The authors treated 6 patients with penicillin-sensitive streptococcic endocarditis by administration of large doses of phenoxymethyl penicillin (penicillin V) combined with streptomycin and dihydrostreptomycin. Clinical and bacteriological cure was achieved in all. Serum penicillin levels were maintained above 1.6 units per milliliter in 5 of the 6 patients, with peak levels averaging 22.3 units per milliliter. There was no evidence of accumulation of penicillin in the serum on continuous therapy. Signs of vestibular damage appeared in 3 patients late in the course of, or after cessation of, streptomycin therapy. The occurrence of vestibular damage thus was greatly in excess of previous experience, and the reason for this has not been established. Two patients had nausea and vomiting of sufficient severity to interfere with therapy and failed to have an adequate penicillinemia until probenacid was administered concurrently. The later finding indicates that serum penicillin levels must be routinely determined when patients with penicillin-sensitive streptococcic endocarditis are treated by the oral route to assure that an adequate penicillinemia is maintained.

The oral administration of 2 million units of penicillin V to normal persons resulted in higher and more sustained blood levels than those obtained with equal doses of penicillin G by mouth. Peak serum penicillin V levels averaged 1.5 to 2.1 times those obtained with penicillin G by mouth. Superior serum levels were noted when penicillin V was ingested after meals. Simultaneous administration of aluminum hydroxide gel tended to depress subsequent serum penicillin levels. Until predictable and uniform absorption of the antibiotic by mouth is assured, parenteral administration of penicillin remains the preferred treatment for the majority of patients with bacterial endocarditis.

Colorado Tick Fever: Observations on 18 Cases and Review of the Literature. C. C. Drevets. J. Kansas M. Soc. **58**:448-455 (July) 1957 [Topeka].

Colorado tick fever was described in 1855 under the term "mountain fever" as an acute, benign, intermittent, nonexanthemic febrile disease. About 1873 an exanthemic fever (Rocky Mountain spotted fever) was first described, and this proved to be

much more serious. For several decades the mountain fever was confused with the spotted fever and was usually considered a mild form of the latter; earlier, the observers of both considered them separate diseases. In 1930 Becker described the clinical findings and proposed the name Colorado tick fever, and Toomey subsequently referred to it as American mountain tick fever. Florio and associates in 1944 transmitted the disease experimentally in humans and in hamsters. They showed the causative agent to be a filterable virus transmitted by the bite of the wood tick, Dermacentor andersoni Stiles. The virus has been isolated and has been transmitted to a number of species of laboratory animals. The geographic distribution of Colorado tick fever follows the distribution of the wood tick, chiefly in the western mountain states.

The author presents clinical, physical, and laboratory findings in 18 patients with Colorado tick fever, observed during the summer of 1955 in the Estes Park Clinic in Colorado. The disease is characterized by a history of contact with a wood tick and the sudden onset of fever, chills, malaise, anorexia, headache, muscular aches and pains, and some less consistent symptoms. The fever curve is of the saddle-back type; an initial fever period lasting about 48 hours is followed by a remission of from 1 to 3 days duration, which in turn is followed by another bout of fever. The chief laboratory finding is a marked leukopenia. The virus can be isolated from the blood during the acute phase, and complement-fixing and neutralizing antibodies are demonstrable during the convalescent phase. Treatment is symptomatic, and the prognosis is favorable. Avoidance of the tick is the most effective preventive measure. It is becoming increasingly important for physicians outside the endemic area of this disease to be able to diagnose Colorado tick fever since the areas of exposure are often frequented by tourists who can easily journey to their homes before the symptoms appear.

Unusual Clinical Features Associated with Severe Aortic Insufficiency. W. P. Harvey, J. P. Segal and C. A. Hufnagel. Ann. Int. Med. 47:27-38 (July) 1957 [Lancaster, Pa.].

Over 300 patients with severe aortic insufficiency of varying etiology were investigated by the authors during the last 5 years. A number of unusual clinical features were observed: 1. Sudden death was most frequent in patients with previous ventricular extrasystoles, usually with advanced stages of heart disease, and it is attributed to ventricular fibrillation. 2. Excessive sweating was observed in the majority of patients and was usually proportional to the clinical stage of congestive failure. Intolerance for heat frequently suggested hyperthyroidism, although no augmentation of thyroid activity can be demonstrated. 3. Cervical (carotid artery) pain occurred that was frequently bilateral and located over the carotid arteries; it generally lasted from 5 to 7 days and could be alleviated only by the use of narcotics. It appeared to originate in the arteries themselves, although there is no proof for this concept. 4. Abdominal pain occurred; this was nonspecific and might simulate peptic ulcer, disease of the gallbladder, pancreatitis, and even renal colic. No organic gastrointestinal lesions were found. The suggestion that it originates in the abdominal aorta has not been proved. 5. Pounding sensations were noted that resulted from severe degrees of aortic regurgitation; if their rhythm is regular they can be tolerated. 6. Angina pectoris occurred in about 50% of the cases; it was not unusual in its manifestations, except that it occurred chiefly at night and was of prolonged duration. It was common in severe aortic insufficiency of rheumatic and also of syphilitic origin. Other unusual aspects were splash sounds, clicking sounds produced by the plastic artificial valve, the association of rheumatoid arthritis with severe aortic insufficiency, the association of coarctation of the aorta with severe aortic insufficiency, and the association of Marfan's syndrome with severe aortic insufficiency.

Acute Benign Pericarditis Associated with Coxsackie Virus Group B, Type 5. S. B. Weinstein. New England J. Med. 257:265-267 (Aug. 8) 1957 [Boston].

The author reports a 25-year-old man with acute benign pericarditis associated with the significant serologic evidence of infection with Coxsackie virus group B, type 5. This disease is usually considered to be a clinical syndrome of unknown origin. It has long been believed that a variety of agents may produce this syndrome. In recent years there is a tendency to associate pericarditis with viral causation, but proof is still missing. Pericarditis has also been linked to Bornholm disease, which is often caused by the Coxsackie group of viruses. With increased knowledge of the Coxsackie viruses and identification of various new types more accurate testing has resulted. It is therefore possible that with the recognition of these new types more data will accumulate to show their relation to human disease.

Diet and Coronary Thrombosis: Hypothesis and Fact. J. Yudkin. Lancet 2:155-162 (July 27) 1957 [London].

It is widely believed that coronary thrombosis is related to the amount of fat, or of a particular sort of fat, in the diet. However, some of the epidemiological data do not fit these simple hypotheses, and it appears that both the proponents and the opponents of a dietary hypothesis are quoting only

those data which support their view. In relating diet to the mortality from coronary thrombosis the author draws on 3 different sorts of statistics. The first is a comparison between diets and coronary mortality in different countries for the same year. The second comparison is between diets and coronary mortality in different classes in Britain. The third comparison is between trends in diets and trends in coronary mortality in Britain since 1928. A consideration of all the data presented suggests that a unitary dietary theory, however modified by considerations of lag, of threshold, and of individual variation in dietary intake, is less plausible than a theory of multiple causes. It is suggested that relative overconsumption of food, associated with reduced physical exercise, may be one of several causes of the disease. These causes are likely to be divisible into predisposing causes and precipitating causes. Their identification requires more study of groups where some of the possible causes are relatively constant, so that differences in incidence of coronary disease may be related to the other possible causes.

Brucella Myocarditis: Observations on Patients Reported in the Literature and on a Group of Patients Seen in the Past Ten Years in the Medical Clinic of the University of Florence. P. Panuccio. Sett. Med. 45:251-263 (May 15) 1957 (In Italian) [Florence, Italy].

The frequency of myocarditis was studied in 137 patients, 93 male and 44 female, with brucellosis in a large Florence hospital in the last 10 years. Twenty-five patients (15 male and 10 female) presented clinical or roentgenological symptoms of cardiovascular disturbance caused by brucellosis in 22; the other 3 patients had suffered latent rheumatic infection. The 22 patients with cardiovascular disturbance caused by brucellosis were 13 to 68 years old and had had the infection for an average of 3 months. The blood pressure was normal in 11 patients and below normal in the other 11. Except for 1 patient, hypotension was found in patients over 50 years of age; in 2 of these subjects the infection ran a severe septic course. Three patients seen soon after contracting the disease presented bradycardia; the course of the infection was typical in 2 patients, and in the third patient a systolic murmur was observed on the 34th day of the disease.

Two patients presented definite myocardial involvement within a month after contracting the infection. The first was a 19-year-old male who for 30 days before entering the hospital had fever, profuse perspiration, asthenia, and mild hepatosplenomegaly. The patient was treated first with chloramphenicol and later with terramycin. The course of the disease was typical for 40 days, when tachycardia, hypotension, respiratory oppression, irregularities in the first tone, and enlargement of the cardiac area were observed. Electrocardiograms revealed disturbance in the conduction within the right ventricle and anterior ischemia. These symptoms improved on the 50th day, when the clinical symptoms had also improved, and the patient was dismissed from the hospital. The second patient, a 68-year-old diabetic, presented symptoms similar to those of the first patient; however, the age of the patient and the presence of diabetes had also to be taken into consideration in making the diagnosis.

Postcomissurotomy Syndrome. S. Z. Rosenberg, K. Braun and S. Stern. Harefuah 53:1-4 (July 1) 1957 (In Hebrew with English Summary) [Tel Aviv, Israel].

Seventy-five patients who underwent mitral valvulotomy were followed up for at least 10 months after the operation. A postcomissurotomy syndrome with a benign and self-limited course developed in 20 patients (27%). Fever and chest pain were the commonest symptoms, but they usually subsided after a few days. Other less common symptoms were dyspnea, tachycardia, pain in the joints, and pleural or pericardial effusion. Laboratory examination revealed moderate leukocytosis and increased erythrocyte sedimentation rate in all. About 50% of the patients had recurrent attacks of the syndrome, which apparently had no deleterious effect on the late results of the operation. There was no correlation between the incidence of Aschoff bodies in the left atrial appendage removed at the operation and the occurrence of the syndrome.

Anamnesis in Patients with Bronchial Carcinoma. F. K. Feiks. Krebsarzt 12:208-219 (No. 4) 1957 (In German) [Vienna].

In investigating the increase in bronchial carcinoma, the author gave particular attention to certain habits (smoking and drinking) and to occupational exposures in two groups of patients with carcinoma of the respiratory tract and their controls. The first group comprised 93 patients with carcinoma of the respiratory tract and their controls observed in the author's department between 1953 and 1956; the second group comprised 4,206 patients with carcinoma of the respiratory organs observed between 1950 and 1954 at the public hospitals in Vienna and whose records were available from the Austrian Cancer Society; 1,030 patients without cancer served as controls for this group. In summarizing the data presented in tables and diagrams the author shows that the right upper lobe was more frequently involved than the other lobes. There was no evidence of a hereditary predisposition to carcinoma. A history of bronchitis or of pulmonary tuberculosis was no more frequent in the patients with carcinoma than in the controls. Infectious diseases with high fever were less fre-

quent in the history of patients with carcinoma than in the controls. Pain in the region of the thorax and influenza-like and pneumonia-like conditions were often early symptoms of carcinoma.

The first examination by a practitioner or even by a specialist resulted in the diagnosis of carcinoma in only about one-third of the patients. There was no difference between patients and controls as regards the consumption of alcohol, but there were decided differences with regard to smoking. Statistics on the occurrence of respiratory cancer in nonsmokers and in light, moderate, and heavy smokers were highly significant. Occupations involving contact with metals, dust, smoke, and motor vehicles were more frequent among the patients with carcinoma of the respiratory organs than in the controls, but occupational exposures did not prove as important as excessive smoking. Especially noteworthy was the more frequent occurrence of laryngeal and bronchial carcinoma in farmers than in persons with other occupations. Unusually frequent and statistically significant was the number of carcinoma patients among the excessive smokers and among those whose occupation exposed them to chronic irritation of the respiratory tract. The findings in the smaller group of 93 patients coincided in all essentials with those in the large number, and thus they can be regarded as representative.

On the Natural History of Esophageal Varices Which Are Secondary to Portal Cirrhosis. E. D. Palmer. Ann. Int. Med. 47:18-26 (July) 1957 [Lancaster, Pa.].

Serial esophagnoscopic examinations, with portal pressure determinations in some cases, were made of the esophageal varices of 133 patients with biopsy-proved cirrhosis of the liver over an average period of 32.6 weeks. It was found that the varices changed in diameter and extent from time to time, with only the slightest tendency to improve as the general clinical course improved and to worsen as the clinical course worsened. Increasing stability was noted as the varices became larger and more extensive. There was no correlation between the apparent duration of the cirrhosis and either varix severity or stability. In 25% of the patients, at least, one examination showed that the varices had disappeared, but this proved to be a temporary disappearance whenever the subsequent course could be adequately followed. In some patients varices disappeared and reappeared very rapidly, these changes being usually without relationship to changes in the general clinical state.

The level of the portal venous pressure showed no correlation with the diameter or extent of the varices, and could not be estimated even roughly from the esophagoscopic appearances. The pressure, like varix severity, varied considerably from time to time, without relation to changes in the clinical picture. In the individual patient, however, it was found that varices did not become smaller when the pressure rose or larger when it fell. It is concluded that the failure of portal hypertension and varix severity in cirrhosis to demonstrate a predictable pattern of behavior indicates that the native portacaval shunting systems (variceal, retroperitoneal, falciform-paraumbilical, hemorrhoidal, etc.) do not act in concert but with a large degree of passive independence. Variations in volume flow through the usual transhepatic venous channels add to the variability of transvariceal flow.

Significance of the Calcinosis Factor (Vitamin D, Dihydrotachysterol) in Therapy of Tuberculosis. F. Holtz and H. Frohberg. Beitr. Klin. Tuberk. 117:265-275 (No. 2) 1957 (In German) [Berlin].

The results obtained by treatment of tuberculosis with calciferol and dihydrotachysterol are based not, as frequently assumed, on a rickets-preventive action but on the effect produced by the calcinosis factor. Calciferol and dihydrotachysterol, when administered in large doses, raise the serum calcium level. This is achieved partly by an increased absorption of calcium in the intestine and partly by mobilization of calcium in the organism. The increased calcium serum level causes obturation of the vascular walls and the endothelium of the serosa, a fact that favors the cure of recent exudative tuberculous processes. Caseous tuberculous foci calcify more rapidly and more intensively with calciferol and dihydrotachysterol. Treatment with tuberculostatic agents combined with the factor of calcinosis gave good results.

Anoxia in Emphysema: Its Relief by Oxygen. T. Simpson. Lancet 2:105-113 (July 20) 1957 [London].

Death may take place after 20 to 30 minutes' exposure at an altitude of 25,000 ft. or more where the oxygen saturation is less than 50%. A respiratory infection in an emphysematous patient is capable of producing an oxygen saturation of 50% or less. Anoxia in these patients should be relieved at the risk of carbon dioxide narcosis. The macroscopic changes resulting from anoxia in the human brain are hyperemia, congestion, and focal hemorrhage of the gray and white matter. More severe mental disturbances as a result of respiratory infection in the emphysematous patient appear to be associated with a lower arterial oxygen saturation and pH rather than with an alteration in the arterial carbon dioxide tension. The role of hypercapnia in the production of mental changes is minimized as the carbon dioxide tension did not rise above 80 mm. Hg. Drowsiness may be the only sign in an otherwise asymptomatic emphysematous patient. Mus-

cular (voluntary) tremor and incoordinate movements are common in the severely anoxic emphysematous patient. Anoxia increases the heart rate and often lowers the blood pressure. The acute anoxia of respiratory infection can result in acute cardiac dilatation and ultimately congestive heart failure, and at the oxygen saturation level of these patients (20 to 50%) a circulatory crisis usually develops. The blood changes in emphysema are as follows: the mean corpuscular volume (M. C. V.) is usually increased, there is a significant negative correlation between the oxygen saturation and capacity, the number of reticulocytes and the serum bilirubin level are normal, the bone marrow shows a normal percentage of erythroid cells, and polycythemia is rare and is usually associated with severe anoxia and heart failure. The low oxygen tension of the liver predisposes the liver cells to damage in anoxia, unlike the kidneys where macroscopic assessment discloses some congestion in an unaltered architecture. No changes in the glomeruli were attributed to anoxia. The administration of gradually increasing amounts of oxygen is emphasized in order that the respiratory center not be depressed and compensation take place over an extended interval of time. One relatively rare danger of oxygen therapy is described as it occurred in a single patient—oxygen addiction. Coma resulting from oxygen therapy is not necessarily fatal, and severe hypercapnia is compatible with a normal mental state. Severe irreversible anoxia can cause irreversible changes in the human organs. Whereas the ill-effects of carbon dioxide narcosis may be reversible, those of unrelieved anoxia are not.

Conditions Involving the Hemopoietic System Resulting in a Pseudorheumatoid Arthritis; Similarity of Multiple Myeloma and Rheumatoid Arthritis. J. S. Davis, F. C. Weber and H. Bartfeld. Ann. Int. Med. 47:10-17 (July) 1957 [Lancaster, Pa.].

A number of isolated cases of multiple myeloma were originally diagnosed as rheumatoid arthritis. At St. Luke's Hospital in New York, 26 patients with multiple myeloma have been observed since 1931. The first symptom in 22 of these patients was joint pain, generally involving the spine. Arthritis of some type was the primary diagnosis in 16. Two of the patients were treated for a long period for rheumatoid arthritis. In these 2 and in the patients with multiple myeloma associated with rheumatoid arthritis reported in the literature, postmortem studies revealed amyloid deposits in and about the joints. One patient with Hodgkin's disease and 1 patient with erythremic myelosis were thought to have rheumatoid arthritis and were treated for this for a long period. Rheumatoid arthritis may be a result of an abnormality in protein metabolism resulting in the deposition of some protein substance, either amyloid or other, in and about the joints, followed by reactions in the synovial and other tissues of the joints involved.

Treatment of Primary-Secondary Syphilis with 15 Million Oxford Units of Penicillin After 3 Injections of Mercury Cyanide: 10-Year Account. M. Bolgert and G. Levy. Presse méd. 65:1267-1269 (July 6) 1957 (In French) [Paris].

Sixty-two patients with primary syphilis and a negative serologic test, 107 with primary syphilis and a positive serologic test, and 137 with secondary syphilis were treated by the authors' method. The patients received 1 intravenous injection of 0.1 Gm. of mercury cyanide on 3 successive days. For the next 3 days they were given 1 million Oxford units of penicillin in daily injections of 200,000, 300,000, and 500,000 units dissolved in isotonic sodium chloride solution; each of these doses first was administered in 8 and later in 5 divided doses. For the next 14 days the patients received 500,000 Oxford units of penicillin in the morning and 500,000 units in the evening of each day. The penicillin therapy was discontinued after 17 days when a total dose of 15 million units of the drug had been given. Clinical and serologic examinations were performed every 14 days until the patients had negative reactions to both the flocculation and complement fixation tests. The examinations were repeated at 3-month, at 4-month, and at 6-month intervals and finally once a year. Of the 306 patients, 63 were lost to follow-up, but 43 of the 63 had negative reactions to serologic tests for several hundred days. Of the remaining 243 patients whose follow-up examinations were continued for periods up to 113 months, 230 obtained satisfactory results. They were clinically normal and had negative serologic tests. Seventeen of these became reinfected. Thirteen of the 243 patients were therapeutic failures. Of these, 2 were considered as clinical failures, 4 were considered as questionable, and 7 had positive reactions to serologic tests in the absence of clinical manifestations. All lumbar punctures except in one patient gave normal results. None of the 37 children born to mothers who were given this treatment manifested congenital syphilis. The conclusion seems justified that 94.5% of the results were definitely satisfactory.

Pharyngo-conjunctival Fever: School Outbreaks in England During the Summer of 1955 Associated with Adenovirus Types 3, 7, and 14. E. J. C. Kendall, R. W. Riddle, H. A. Tuck and others. Brit. M. J. 2:131-136 (July 20) 1957 [London].

Clinical, laboratory, and epidemiologic features of outbreaks of pharyngoconjunctival fever associated with adenovirus infection in 7 residential schools for boys in England during the summer of 1955 are described. The illness was characterized

by 3 to 5 days' fever, sore throat, blocked nose, enlarged cervical lymph nodes, and painless conjunctivitis. A detailed clinical description based on the study of 169 patients in 2 of the outbreaks is given. Serologic evidence of adenovirus infection was obtained in all 7 outbreaks, and virus strains were isolated from throat washings or eye swabs from 52 patients in 5 schools where this was attempted. Three of the outbreaks appeared to be caused by type 3 virus, 1 by type 7, and 1 by type 14. In 3 schools in which the influence of age on susceptibility was studied, illness attack rates fell with rising age.

Acute Renal Failure Following Intravascular Haemolysis. G. M. Bull, A. M. Joekes and K. G. Lowe. Lancet 2:114-117 (July 20) 1957 [London].

Sixteen patients had acute renal failure associated with known or probable intravascular hemolysis; in 13 this followed blood transfusion and was due chiefly to technical errors in cross matching, while the other 3 cases were due to an unexplained hemolytic episode following pregnancy, a severe hemolytic episode in falciparum malaria, and a fatal hemolytic episode following splenectomy in nocturnal hemoglobinuria. The acute renal failure seen in the hemolytic transfusion reactions and in 2 other cases possibly involving intravascular hemolysis was comparable to the acute renal failure seen in poisoning, criminal abortion, and the concealed accidental hemorrhage of pregnancy. Of the 13 patients experiencing hemolytic transfusion reactions only 5 recovered. With modern standards of careful conservative management supplemented by dialysis, 5 of the 8 deaths could probably have been avoided, as the real need of transfusions was sometimes questioned. The mortality in tubular necrosis due to transfusion reaction will in all likelihood be higher than that due to poisons, criminal abortion, or concealed accidental hemorrhage for the simple reason that the patients who have had transfusion carry the added burden of the primary disease that necessitated transfusion initially. Age is a prime consideration here, as older patients tolerate protracted anuria badly. One case of transfusion reaction (nonhemolytic) due to contaminated blood is reported, as is one unexplained nonhemolytic episode. No renal failure following intravascular hemolysis due to accidental infusion of distilled water or to irrigation with distilled water at prostatectomy was reported.

Severe Diabetes with Remission: Report of a Case and Review of the Literature. R. Harwood. New England J. Med. 257:257-261 (Aug. 8) 1957 [Boston].

The author reports an unusual remission of severe diabetes in a 24-year-old man with diabetic acidosis. During 9 hours after his admission to hospital the patient was given 130 units of crystalline insulin and 4 liters of fluid parenterally, mostly as an 0.85% solution of sodium chloride. The blood sugar level fell and the acidosis was quickly corrected. He was regulated on a diet of 300 Gm. of carbohydrate, 130 Gm. of protein, and 120 Gm. of fat (2,800 calories). He was discharged from the hospital 2 weeks later, well controlled on 80 units of lente insulin. The urine remained entirely free of sugar for the next 3 months, and, because of consistently low blood sugar tests, the dose of lente insulin was gradually reduced to 50 units. After a moderately severe attack of hypoglycemia, the dose of insulin was reduced to 25 units daily, and administration of insulin was discontinued after another mild attack of hypoglycemia. No change was made in the diet.

The brief duration of the acute symptoms and the whole-hearted cooperation of the patient doubtless favored the recovery that permitted him to live on a mildly restricted diet without insulin up to the time of publication, 23 months later. Only few cases of similar recovery after acidosis in adults were collected from the literature, but these suggest that restoration of function of the islands of Langerhans in early diabetes is always a possibility and that attempts to achieve this by the strictest control with diet and insulin should make such remissions a more common occurrence.

SURGERY

Resection and Homograft Replacement of Innominate and Carotid Arteries with Use of Shunt to Maintain Circulation. M. E. De Bakey and E. S. Crawford. Surg. Gynec. & Obst. 105:129-135 (Aug.) 1957 [Chicago].

Aneurysm, tumor, arteriosclerotic fistula, and arteriosclerotic occlusion can involve the innominate and carotid arteries to the extent that excisional therapy is necessary to maintain normal circulatory dynamics. This type of therapy for lesions in other arteries of this same size is usually accomplished with technical ease and a lack of physiological disturbances and neurological sequelae. Surgical excision of lesions of the innominate and carotid arteries is complicated by (1) their location within the thorax, the need for adequate exposure necessitating a combined neck and chest approach, and (2) the necessity of temporary circulatory arrest in vessels supplying the acutely anoxia-sensitive brain, in which brief periods of arrest may produce severe ischemic damage. Proper exposure was obtained in the single reported case with use of a combined cervicothoracic approach without clavicular removal. This type of approach is advocated, as it has the advantage of providing direct and generous accessibility to the arteries both proximal and distal to the

aneurysm, permitting safe control of these vessels facilitating the use of a shunt, and stable wound repair with complete restoration to normal of the anatomic and functional relationships of the neck and thorax minimizing postoperative pulmonary disturbances. No correlation exists between the duration of the period of circulatory arrest and the occurrence of neurological disturbances. The variability in the tolerance of the brain to different periods of carotid occlusion is dependent on a number of factors: age, nature of the lesion, and, particularly, development of adequate collateral circulation. Hypothermia and the use of a temporary shunt have been used to protect the brain against ischemic damage consequent to temporary arrest of the carotid or innominate circulation. The maintenance of normal cerebral circulation during as well as after operation, considered the most effective solution to the problem, is obtained by using a shunt consisting of a segment of tygon tubing with lucite cannulas at each end of the bypass. The use of the lucite cannulas at the end of the shunt has been found to be a significant factor in the occurrence of transient hemiplegia immediately after operation, in contradistinction to the utilization of 14-gauge and 16-gauge needles, with which the blood flow is considerably less. This method of bypass employing polyvinyl tubing with specially tooled lucite cannulas is adjudged the most satisfactory procedure because of its simplicity of application and its efficacy in providing complete protection against ischemic damage to the brain during excisional therapy for disease of the innominate or carotid arteries.

Calciuria as an Indicator of the Efficacy of Hormone Therapy in Metastasized Mammary Carcinoma. J. Gerbrandy and H. B. A. Hellendoorn. Nederl. tijdschr. geneesk. **101**:1257-1263 (July 6) 1957 (In Dutch) [Haarlem, Netherlands].

Various forms of hormone treatments were used in treating 40 patients with mammary carcinoma and osteolytic metastases. Androgenic hormones were given 63 times, cortisone 12 times, oophorectomy was performed 9 times and adrenalectomy 7 times (in 4 of the latter oophorectomy was done simultaneously). Androgenic hormones were given also to 5 additional patients in whom osteolytic bone metastases and hypercalciuria resulted from carcinoma of the bronchus or the kidney. The clinical results obtained with these forms of hormone therapy were compared with simultaneous changes in the urinary excretion of calcium. It was found that in patients with osseous metastases and calciuria favorable results of hormone therapy are always accompanied by a fall of the urinary excretion of calcium to normal or subnormal levels. However, a fall in calciuria is not necessarily accompanied by clinical improvement. This may be due to the nonspecific anabolic effect and to the calcium retention produced by the sex hormones. A renewed rise in calcium excretion is always accompanied by clinical exacerbation. Regular checking of calciuria and of the calcium content of the blood are indispensable in judging the results of hormone therapy in patients with breast carcinoma with osteolytic metastases. These tests are valuable also in ascertaining whether androgenic hormones cause increase in tumor growth and in diagnosing acute spontaneous hypercalcemia.

Intraductal Papilloma of the Breast. J. W. Hendrick. Surg. Gynec. & Obst. **105**:215-223 (Aug.) 1957 [Chicago].

A follow-up from 5 to 18 years of 208 patients with intraductal papilloma revealed that these patients were no more likely to develop carcinoma of the mammary gland than a like number of women in the same age group without the intraductal papilloma. J. C. Bloodgood regarded intraductal papilloma as a relatively innocuous lesion and did not believe it to be precancerous. He believed that a serosanguineous or bloody nipple discharge was caused by the intraductal papilloma and not by a carcinoma. He advised local excision, and felt that a mastectomy was too radical for a benign breast lesion and inadequate for a malignant tumor. The presenting symptom in the majority of the 208 patients was a serosanguineous or bloody discharge from the nipple, a symptom which has been seen even more frequently in recent years due in part to the instructive work of several agencies in disseminating information on cancer control. The greatest incidence of this disorder occurred between the ages of 30 and 50 years, which is approximately 5 years earlier than in another group of 452 patients with primary carcinoma of the breast. Symptomatology included a spontaneous, serosanguineous nipple discharge in 190 (91%), a tumor mass in 96 (46%), and pain and inflammation in 41 (20%).

All of the patients (157) in whom the intraductal papilloma was observed in the areolar area of the breast had a nipple discharge, in contrast to 33 of 51 patients (64%) having a lesion in the periphery of the breast. Twenty-two patients had deformed nipples produced by the tumor, 14 having slight nipple retraction and 8 having a fulness produced by the disturbed duct causing a disturbance in the contour of the nipple. Twenty-four patients had a dimpling or retraction of the skin; the lesion was located in the periphery in 16 and in the areolar area in the remaining 8. Pathological differentiation of benign and malignant papillary diseases is rarely a problem when the duct wall is intact. Differential diagnosis of intraductal papilloma must first exclude "cystic disease" of the breast, primary carcinoma, fibroadenoma, adenosis, ectasia of the ducts, fat necrosis, and chronic abscess. Point pres-

sure testing is used to elicit a nipple discharge in order to determine which duct contains secretion. The presence of intraductal papilloma, as evidenced by serosanguineous or bloody nipple discharge or a palpable tumor, is adequate justification for its removal. A very ingenious method of excising a duct involved by intraductal papilloma described by Babcock is reported as being used by a number of surgeons with excellent results, treatment of intraductal papilloma consisting of removal of the involved duct and its tributary breast parenchyma.

Scalene Node Biopsy: Its Value as a Diagnostic Aid in Chest Diseases. P. Schiff and B. A. Warren. Dis. Chest. 32:198-206 (Aug.) 1957 [Chicago].

The easily accessible scalene lymph nodes lie in close proximity to the thoracic lymph nodes, and their biopsy has been suggested as a diagnostic aid in intrathoracic lesions, because, despite refinements in roentgenoscopy, cytological study of the sputum, bronchoscopy, bronchoscopic biopsy, thoracoscopy, and exploratory thoracotomy, the exact diagnosis in intrathoracic disease is still difficult in some patients. In order to show how often pathological changes in these nodes may be correlated with changes elsewhere in the body, particularly with those of intrathoracic origin, the authors present their findings on the scalene lymph nodes in a consecutive series of routine autopsies. In 123 autopsies, in which nodes from both sides of the neck were examined, the over-all incidence of positive findings was 16.3%; 45.5% were positive in cases in which lymph node involvement would have been possible. The incidence and distribution of scalene node changes in cases of abdominal malignancy supported the hypothesis that the left node is involved first in such cases.

The authors list the following indications for biopsies of the scalene lymph nodes: (1) in obscure intrathoracic conditions to establish a diagnosis such as in carcinoma or in sarcoidosis of the lung; (2) in patients in whom the diagnosis is certain but in whom involvement of these nodes will affect the prognosis, treatment, or management, i. e., when carcinoma of the lung has metastasized to the scalene nodes; and (3) for diagnosis of disease involving lymph nodes, e. g., leukemia, Hodgkin's disease, and lymphosarcoma.

Acute Postgastrectomy Pancreatitis. C. C. Burton, W. G. Eckman Jr. and J. Haxo. Am. J. Surg. 94:70-79 (July) 1957 [New York].

Acute hemorrhagic or necrotizing pancreatitis arising as a complication of gastrectomy is rare. The mortality rate due to acute pancreatitis was 0.7% in 1,689 patients who underwent gastric resection. In another series of 348 patients there were 5 deaths (1.4%) from pancreatitis. The most frequent and important causative factors of pancreatitis were trauma to the head of the pancreas and injury to the biliary or pancreatic ducts. Vagotomy with antral gastrojejunostomy should be given priority in patients in whom the ulcer penetrates the pancreas. Resection of the involved duodenum should be performed when hemorrhage is the predominant symptom. It may be advisable to limit the operative procedure to simple ligation of the bleeding vessel with closure in the poor-risk patient. Anomalies of the biliary and pancreatic ductal system and of the blood supply to the duodenum and pancreas occur with sufficient frequency to emphasize the need for the gastric surgeon to be familiar with these variations. The author warns against excision, curettage, or cauterization of the base of the ulcer. Many diagnostic, clinical, and therapeutic features of acute pancreatitis remain still unsolved.

Bleeding in Colonic Diverticulitis. J. E. Mobley, M. B. Dockerty and J. M. Waugh. Am. J. Surg. 94:44-51 (July) 1957 [New York].

Pathological, clinical, and follow-up studies were made on 32 patients with colonic diverticulitis associated with bleeding. There were 19 men and 13 women, and their ages ranged from 26 to 77 years; only one patient was under 40, and 3 were more than 70 years old. Gross blood has passed from the rectum by all the patients. Bleeding was mild in 12, moderately severe in 19, and severe in one of the patients. The duration of bleeding varied from less than 3 months to 5 years. Rectal bleeding was overshadowed by other symptoms in 25 patients, such as abdominal pain, chills, fever, diarrhea, decreased caliber of stools, constipation, and dysuria. Abdominal tenderness was encountered in 15 patients, extrarectal mass in 9, mass in the left lower abdominal quadrant in 6, and intrarectal mass in 2. Most of the patients had physical findings suggestive of diverticulitis, but the results of examinations were completely negative in 7 (22%). On 29 patients proctoscopic examinations were made. Bleeding zones were seen in the intestinal mucosa of 2 patients. Entirely negative results of proctoscopic examination were recorded for 7. The other patients had pathological proctoscopic findings unrelated to the rectal bleeding. Definite diagnosis of diverticulitis was made after roentgenologic examination in 18 of the 30 patients; this diagnosis was suggested in 4 others. Definite roentgenologic diagnosis of carcinoma was reported in only one patient. In the remaining patients the presence of a neoplasm in the colon was considered. Surgical exploration was performed on 31 patients. In one only was the problem of bleeding the sole surgical indication. Five different types of operative procedures were performed. Two patients died: 1 of peritonitis and bronchopneumonia after transverse colostomy and the other, who had massive rectal

bleeding 2 weeks previous to admission, of myocardial infarction. Follow-ups for periods up to 10 years were made on 24 of the surviving patients. No further symptoms attributable to diverticulitis were observed in 23. One patient developed intestinal obstruction several years after operation; he recovered with conservative treatment.

The pathological findings were typical of those found in diverticulitis. Microscopic findings disclosed that 18 (56%) of the patients had ulceration, either of the colonic wall or within diverticula. These ulcerated zones proved to be typical inflammatory ulcers characterized by absence of surface epithelium, destruction of the submucosa, vascular engorgement, and evidence of acute inflammation. The ulceration was considered sufficient to produce bleeding. One of the specimens contained an ulcerated inverted diverticulum. The possibility of this rare condition is emphasized because of the danger of mistaking such a lesion for a polyp. It is difficult to differentiate bleeding due to diverticulitis from that due to neoplasm, and both diseases may occur simultaneously.

Surgical Treatment of Atrial and Ventricular Septal Defects: Results in 63 Patients. D. A. Cooley, D. G. McNamara and J. R. Latson. South. M. J. **50**:1044-1047 (Aug.) 1957 [Birmingham, Ala.].

Forty-nine of 63 cases of isolated congenital septal defects involved the interventricular septum and 14 the interatrial septum. A mechanical pump-oxygenator was used for temporary cardiopulmonary by-pass in all 63 patients, none of whom was refused operation because of poor condition, the operation being undertaken in many as a last resort. In patients selected for operation a large septal defect was suggested by cardiac dilatation, pulmonary hypertension, or frank congestive heart failure. A modified DeWall-Lillehei bubble diffusion system oxygenator was used, all portions of which were discarded at the completion of the operation. Where a bloodless field was deemed desirable in cases of ventricular septal defect, cardiac arrest was induced with use of a dilute potassium citrate solution. A mortality of 16.3% (49 patients with 8 deaths) occurred in the surgical correction of ventricular septal defect. Most of the operations were performed on children, 18 of whom were less than 2 years old and in poor condition for withstanding the trauma of surgery. More than half of the patients in this group had associated cardiac anomalies which further increased cardiac disability adding to the technical problems of the operation. Eighteen patients with moderate to severe pulmonary hypertension obtained the greatest improvement postoperatively, with up to 50% decrease in the pressure. A mortality of 14.2% (14 patients with 2 deaths) ensued in the repair of atrial septal defects, all patients save one being female and ranging in age from 5 to 50 years. One of the fatalities occurred 3 days after the operation, in a 50-year-old women who had been bedridden for years with intractable congestive failure, the other fatality being due to massive air embolism following potassium-induced arrest. A careful and complete closure was obtained in the other 12 patients, who tolerated the operation extremely well, a decrease in pulmonary vascularity, reduction in cardiac size, and relief of symptoms following repair of the defect. Cardiopulmonary by-pass has been found to be efficacious in 36 other patients variously affected with infundibular pulmonic stenosis, aorticopulmonary septal defect, atrioventricularis communis, subaortic stenosis, single ventricle, and some cases of tetralogy of Fallot.

Long Term Survival Following Right Hepatic Lobectomy. A. Brunschwig. Am. J. Surg. **94**:2-8 (July) 1957 [New York].

The clinical records of 4 patients who underwent total (3) and subtotal (1) right lobectomy are presented. The lesions were massive angiomas in 2 patients, who are living and well 6 years and 5¼years, respectively, after the operation. The lesions in 2 patients were malignant hepatomas. Subtotal right hepatic lobectomy was performed in one of these patients when she was 14 years old. Five years later she married and is living and well. Partial right hepatic lobectomy was performed in the other patient; 2 years later the right hepatic lobectomy was completed because of metastasis from the primary lesion; the patient leads a normal existence 2¼ years after the second operation.

The human organism is quite capable of surviving in normal condition with only the left lobe of the liver in situ. The right hepatic lobectomy has a very large factor of safety. The showing of no physiological disturbances in the 4 patients is ample evidence of adequate function of the left lobe in maintaining general physiological requirements. Two general principles of excision are described: the immediate transection of the lobe through its base, and the so-called controlled method. Both procedures can be performed satisfactorily.

Operative Cholangiography in Surgery of the Biliary Tract. M. Corff. Am. J. Surg. **94**:9-18 (July) 1957 [New York].

A series of 100 consecutive patients treated during 1955 were reviewed, and exploration of the common duct and operative as well as postoperative cholangiograms were performed. There was no mortality in this series. Little or no morbidity was due to the procedure of operative cholangiography. Dilatation of the common duct was the indication in 50% of the patients and jaundice in 28%. In 47%

of the patients stones were found in the common duct; 27% of these patients had stones without jaundice. Precholedochostomy films appeared not to be accurate enough to be of real value. The postcholedochostomy cholangiogram has proved to be more valuable: it demonstrated stones left in the common duct after exploration in 5% of the patients. The common duct was reopened and the stones removed before the incision was closed. One or more postoperative cholangiograms were taken in all of the 100 patients. Under ideal circumstances the incidence of retained stones might have been reduced to 2%. Operative cholangiography, especially the postcholedochostomy type, should be used in every case in which exploration of the common duct is performed. But it cannot and should not replace surgical skill and experience in the treatment of stones in the common duct.

Observations on a Group of 105 Patients with Chronic Subdural Hematoma. D. Cuccia. Riforma med. 71:726-729 (June 29) 1957 (In Italian) [Naples].

One hundred five patients, 89 male and 16 female, with chronic subdural hematoma, spontaneous in 24 and post-traumatic in 81, are reported. The majority of the patients were from 40 to 60 years old. Patients with the post-traumatic form were able to return to their usual activities soon after the trauma had occurred; some of these patients noticed mild headache, asthemia, and loss of weight; these symptoms eventually became worse. Marked symptoms appeared suddenly in 12 patients. Diagnosis was difficult in the absence of history of trauma. The symptoms were not consistent and in some cases disappeared for brief periods of time. Bradycardia was not too frequent. Psychic symptoms were present in most patients. Roentgenologic examination revealed a fracture caused possibly by a latent trauma in 11 patients. For the diagnosis the author relied mainly on angiography for patients with post-traumatic hematoma and on ventriculography for patients with spontaneous hematoma. Very good results were obtained with trephine operation performed according to the usual technique, with the exception that a cannula of small caliber was used for drainage. Three patients, 1 with spontaneous hematoma, died. The postoperative course was more complicated in patients with spontaneous hematoma.

Cardiac Arrest One Hour Following Pneumonectomy. N. C. Hamel and L. A. Brewer. A. M. A. Arch. Surg. 75:277-281 (Aug.) 1957 [Chicago].

A successful resuscitation of a patient with cardiac arrest due to massive intrapleural hemorrhage is reported, in whom the right main pulmonary artery was religated and the heart revived one hour after pneumonectomy. The successful outcome of this case was due to several factors: the prompt detection of the cessation of vital signs by the special nurse; the immediate decision to reopen the chest; the readiness of the operating room for a thoracotomy and the immediate availability of the anesthetist; the location of the postoperative room next to the operating room; and the availability of a large quantity of type O blood and the presence of a cannula in the ankle vein, which made rapid restoration of the blood volume possible. The best medium to provide oxygen to the sensitive nervous system is whole blood, with the oxygen-carrying capacity of the hemoglobin. No neurological sequelae were observed. It must be, therefore, presumed that some cerebral circulation was maintained from the moment the diagnosis of cardiac standstill was made until the heart action was resumed. It was important that the patient had no prolonged periods of hypoxia during the operation or in the immediate postoperative period, so that the brain was well oxygenated up to the point of the cardiac standstill.

Primary Cardiac Tumors: Surgical Treatment. R. Robertson. Am. J. Surg. 94:183-193 (Aug.) 1957 [New York].

The author operated on 5 patients with primary tumor of the heart. Two patients are apparently cured, 1 was improved for several years, and 2 died. The first patient, 2 years old, was given a diagnosis preoperatively of mediastinal dermoid cyst. At operation a teratoma of the pericardium was found. The right coronary artery was embedded in the mass. The tumor appeared to obtain its blood supply from 2 large vessels springing from the right coronary artery at its origin. The tumor was removed. There was considerable bleeding from the branch of the right coronary artery entering the tumor. Cardiac arrest occurred 3 times. Heart beat could not be restored the third time. It was thought that the right coronary artery may have been occluded by the ligature. The second patient, a 34-year-old woman, was given a preoperative diagnosis of pericarditis with effusion. At operation several tumor nodules were found, scattered over the visceral and parietal pericardium. Pathologists diagnosed the tumor as cylindroma, metastatic adenocarcinoma, and carcinoma. The patient remained well for 5 years and died of local recurrence of the tumor. The third patient, a 47-year-old woman, died a month after the operation. At operation there was found a white, fleshy mass of tissue, which surrounded and infiltrated the great vessels within the pericardium. It was not possible to remove the tumor. At autopsy the heart was found to be grossly enlarged. There was widespread involvement of the pericardium by a malignant process. The tumor infiltrated the wall of the right atrium, protruding into the atrial cavity. It was not

possible to find the primary site of the tumor. The lesion was thought to be a mesothelyosarcoma of pericardial origin.

The 4th patient, aged 3 years, had a lymphangioma of the pericardium. A hard mass the size of a small orange was found attached to the pericardial sac, the right atrium, right ventricle, superior vena cava, and aorta; it was removed with difficulty. During the dissection the right coronary artery was encountered, and a small artery appeared to branch from it into the cyst. This was ligated and divided and the right coronary artery protected. The patient made a good recovery. Previous unfortunate experiences, in which uncontrolled bleeding from the aorta was encountered, led to increased care being taken in dissection in this area and contributed to the favorable result. The 5th patient, a 38-year-old woman, was operated on for mitral commissurotomy, but her mitral valves were found to be normal. A round tumor mass was palpable in the left atrium. Since preparations had not been made for dealing with this condition, the tumor, diagnosed as myxoma of the left atrium, was removed at a second operation with the patient under hypothermia at 30 C. The patient had a stormy but favorable recovery. Hypothermia or use of the heart-lung apparatus is recommended for removing a myxoma of the atrium. All patients who clinically appear to have mitral or tricuspid stenosis must be considered as possible atrial tumor suspects, particularly in the absence of rheumatic fever or when the tricuspid is involved singly.

The Bypass Graft: Its Use in Arterial Occlusive Disease. J. H. Payne, N. E. Rudy and T. Winsor. Am. J. Surg. **94**:171-182 (Aug.) 1957 [New York].

The authors used 23 bypass grafts in 15 patients with arteriosclerotic insufficiency of the peripheral blood vessels. This condition is often due to localized obstruction with a patent arterial system above and below the obstruction. Three patients were Negroes. The ages varied from 39 to 76. The patients underwent clinical and vasographic examination. Vasograms proved of value in the selection of patients for the bypass graft and for lumbar sympathectomy. The obstructions which were bypassed were located in the following arteries: the superficial femoral in 13 cases, the external iliac in 12, the common iliac in 11, the internal iliac in 10, the common femoral in 8, the aorta in 3, the popliteal in 2, and in the arteries distal to the popliteal in 2. Lyophilized arterial homografts were used for the bypass. The initial results were excellent in 17 patients, improved in 2, and poor in 4. No patient's blood flow was impaired by the surgical procedures; however, an amputation was unavoidable. Two of the patients included in the poor-results group required revision of the grafts during the immediate postoperative period and were converted to the excellent-results group. Vasographic examination of 2 of the 4 grafts with poor results suggested that arterial disease was present distal to the popliteal bifurcation before surgery. The 4th patient died on the 3rd postoperative day from renal failure and toxemia due to a gangrenous leg. The final outcome with these patients is not known.

Incidence of Megaloblastic Anemia After Subtotal Gastrectomy. L. D. MacLean. New England J. Med. **257**:262-265 (Aug. 8) 1957 [Boston].

Assays for the intrinsic factor in the gastrointestinal tract were made with the aid of the absorption of cobalt-60-labeled vitamin B_{12} in a group of 13 patients who had undergone various types of subtotal gastrectomy at least 3 months previously. A clinically significant lack of intrinsic factor, comparable to that seen after total gastrectomy or in patients with pernicious anemia, was observed in 1 of the 13 patients. Microscopic examination of the resected portion of the patient's stomach revealed chronic cellular infiltration, intestinalization of the mucosa, absence of parietal and chief cells, and atrophy of all layers. The patient had a normal hemoglobin and a negative bone-marrow biopsy at the time of this investigation. The same microscopic changes in the resected stomach as had been observed in this patient with abnormal absorption of cobalt-60-labeled vitamin B_{12} were found in 9 patients with megaloblastic anemia after subtotal gastrectomy; these patients were detected after screening of 1,500 patients who had undergone this operation. It is suggested that patients who are capable of producing adequate quantities of intrinsic factor when endowed with an intact stomach may be rendered deficient in this capacity if the stomach is subtotally resected.

Megaloblastic anemia indistinguishable from pernicious anemia is a late but inevitable sequela of total gastrectomy and probably of proximal subtotal gastrectomy with esophagoenterostomy. The occurrence of megaloblastic anemia after subtotal gastrectomy can apparently be predicted with the aid of microscopic examination of the resected stomach.

Soft Tissue Sarcoma of the Shoulder, with Thirty-six Years' Survival. H. Charache and J. J. Gainey. A. M. A. Arch. Surg. **75**:263-266 (Aug.) 1957 [Chicago].

A woman with a large round-cell sarcoma of the shoulder is reported who is living and well 36 years after onset of symptoms. She had had 4 local excisions and 4 recurrences. She also received 4 courses of treatment with deep x-ray therapy and 2 implantations of radium. In these 10 years she had no metastases, although the tumor was highly malignant. She developed erysipelas severe enough to require hospitalization. Ten years later the patient's arm became ulcerated and necrotic and began to

slough. An interscapular thoracic amputation without disarticulation was performed. The patient received 3 more courses of deep x-ray therapy. She is now living and well, with her only complaint intermittent dyspnea on exertion. This patient apparently has an abundance of an anticarcinogenic factor, also called cancer resistance or growth control.

Annular Pancreas. T. J. Whelan Jr. and G. B. Hamilton. Ann. Surg. 146:252-262 (Aug.) 1957 [Philadelphia].

The observation of 3 patients with annular pancreas induced the authors to review the literature on the theories of development of annular pancreas, its complications, and its clinical picture. The reports on the 93 patients operated on for annular pancreas through 1955 are analyzed as regards the incidence of other anomalies, incidence of associated peptic ulcer, or pancreatitis, and the results obtained with various methods of treatment. Eleven different surgical procedures and the results obtained with them are listed.

An attempt has been made to standardize the surgical therapy of this condition. Duodenojejunostomy is recommended as the treatment of choice when duodenal obstruction only is present. Gastrectomy without division of the annulus with gastrojejunostomy is recommended in those patients having associated peptic ulcer. In patients in whom the annulus is the isolated site of pancreatitis, resection of the ring is suggested. It is emphasized that when the entire pancreas, including the annulus, is the site of chronic relapsing pancreatitis the treatment cannot be standardized. This latter situation represents the biggest problem in the surgical therapy of annular pancreas. The authors believe that the high incidence of duodenal stenosis and atresia in children with annular pancreas and of duodenal stenosis in adults is more than a mere coincidence. They point out that in the 6-week to 7-week embryo, the duodenum with the ventral anlage undergoes rotation, while at the same time the lumen of the gut is evolving from its solid state. Since atresia or stenosis is believed to be an incomplete evolution from the solid state, a temporary arrest in development at this stage might explain the frequent association of the 2 defects.

Fatal Postoperative Pancreatitis. D. O. Ferris, T. E. Lynn, J. C. Cain and A. H. Baggenstoss. Ann. Surg. 146:263-273 (Aug.) 1957 [Philadelphia].

The authors reviewed the records of 9 patients in whom postoperative pancreatitis terminated in death. They were observed at the Mayo Clinic from 1940 to 1955. In 1 patient the pancreatitis followed a pancreatic biopsy, in 3 it followed biliary tract operation, in 1 it followed a gastric operation, and in 4 it followed operative procedures distant from the pancreas. The clinical manifestations of postoperative pancreatitis generally appear within the first few days after the operation. In this series the complication appeared on the day of operation in 5 and by the third postoperative day in all of the cases. The patients were beyond the age of 40 years.

A common etiological factor is lacking. Some form of obstruction to pancreatic drainage, trauma to the gland, and interference with pancreatic blood supply are frequently considered. The possibility of humoral-borne proteolytic enzymes or allergic phenomena in the pathogenesis of pancreatitis bears further investigation. The prominent clinical features include abdominal pain, shock, vomiting, fever, abdominal distention, oliguria, azotemia, hypochloremia, acidosis, hyperamylasemia, and hypocalcemia. Prompt recognition and treatment are essential if one is to reduce the mortality from this complication. Once pancreatitis is suspected, the management includes continuous nasogastric suction, cautious control of fluid and electrolyte balance, broad-spectrum antibiotics, a vagal blocking agent, and the avoidance of morphine and allied agents. Occasionally, toxemic mental symptoms will necessitate the use of a sedative. Autopsy was performed in 8 of the 9 fatal cases reviewed. Pancreatic necrosis was found in 5 cases and hemorrhagic necrosis in 3. In 7 cases there was necrosis of the renal tubular epithelium, which was most severe in the lower portion of the nephron. The presence of trypsin may be a factor in the association of pancreatitis and lower nephron nephrosis, but certainly shock, when it is present, is also of great importance in the pathogenesis of the renal lesion.

Spontaneous Rupture of the Hepatic Duct. R. E. Snyder. Ann. Surg. 146:246-251 (Aug.) 1957 [Philadelphia].

Review of literature revealed that spontaneous rupture of the hepatic duct is a rare condition and that only 4 such cases have been recorded. The author reports a 51-year-old woman in whom a diagnosis of acute cholecystitis was entertained and perforation of the gallbladder with the bile peritonitis was to be ruled out. Immediate operation was advised because of the evidence of early spreading peritonitis. The parietal peritoneum was of a golden yellow color, and following its incision a large quantity of bile-colored fluid was found free in the right upper abdominal cavity. The bile was aspirated, and on careful search its source was found to be a small pinpoint opening high under the quadrate lobe of the liver near the porta and on the anterior surface of the portal triad. The visible portion of the gallbladder wall was intact. The common duct was incised and explored for the presence of stones as were the hepatic duct and the right and left tributaries of the hepatic duct.

The gallbladder was removed, and as the cystic duct was mobilized from its intimate and parallel relationship to the hepatic and common ducts, the exact anatomic location of the perforation was proved. It lay in the anterior wall of the hepatic duct, approximately 2 to 3 mm. above the junction of the cystic duct with the common duct, and it measured approximately 1 to 2 mm. in diameter. The patient's postoperative course was stormy. Her convalescence was complicated by ascending cholangitis characterized by a moderate degree of jaundice. Four weeks after the operation all drainage from the T-tube and incision had ceased, and the patient was discharged 5 weeks following the operation. One week later the T-tube was removed, and she has remained well. The author reviews the other 4 cases of spontaneous perforation of the hepatic duct that have appeared in the literature.

Diverticulitis of the Colon: Radical Versus Conservative Treatment. W. W. Greene. Am. J. Surg. 94:282-291 (Aug.) 1957 [New York].

Diverticulitis of the colon is a progressive disease found mainly in the older age group. A group of 353 patients with diverticulitis of the colon was observed in the San Francisco Hospital during the last 10 years. The admission diagnosis of the patients in this series indicated that diverticulitis can simulate a variety of conditions. Frequently it is difficult to differentiate between the symptoms of diverticulitis and carcinoma of the colon. There were 15 acute perforations with peritonitis. Sixty-two patients were admitted because of gross bleeding. Those with the most bleeding seemed to have the most advanced diverticulitis. Hemorrhage from the colon may be a sign of impending perforation. Two-thirds of these patients have had recurrences, with over half of them having complications; conservative treatment seemed adequate for only one-third. Each case should be followed as an individual problem. The author recommends surgical therapy instead of conservative treatment for patients showing signs of recurrent diverticulitis of the colon as well as for its complications. With the improved surgical techniques, the mortality rate in most reported series of resections was under 3%.

Resection is suggested for patients with the following conditions: complications of diverticulitis (obstructions, perforation, abscess, fistulas, etc.), recurrent attacks of diverticulitis, persistent deformity shown by barium enema, recurrent massive bleeding from the colon if the diverticulitis is localized, and persistent urinary tract symptoms associated with diverticulitis. A one-stage resection in an acute case is not advisable. The one-stage procedure may be attempted when the intestine can be adequately prepared and when there is no evidence of acute inflammatory process, obstruction, or sinus or fistula formation. There were 27 deaths attributable to diverticulitis of the colon and its complications in this series. Ten deaths were due to perforations with peritonitis among the nonoperative group. The over-all mortality rate was 15.1%. In the past, diverticulitis of the colon has been treated conservatively at the San Francisco Hospital. Surgery was performed only for the complications and accounts for the varied procedures and the high mortality rate found in this series.

Current Investigation in the Homograft Problem. J. A. Cannon, P. I. Terasaki and W. P. Longmire. Am. J. Surg. 94:303-312 (Aug.) 1957 [New York].

The authors succeeded in obtaining a permanent homograft survival of skin in both members of one pair of day-old chicks. Later they homografted 50 chicks in a 2-hour period. They noticed that the more closely related the 2 breeds of chicks used, the higher the incidence of permanent homograft takes. Homografting between day-old chicks of any 2 common breeds rarely resulted in a permanent homograft take of less than 5%. Homograft survival occurred only in chicks grafted before they reached 7 days of age. Chick pairs grafted when more than 7 days old, though showing usually a 100% take of autografts, never showed homograft survival longer than 2 to 3 weeks. If skin from chicks of increasing age was grafted onto day-old chicks, a definite though decreasing incidence of long-term homograft survival was obtained until the skin used was 14 or more days older, at which point the grafts were uniformly sloughed. The authors applied the theory of immunological tolerance to homografts which is as follows: If living cellular material is injected from a donor into a host in an embryonic or, in some cases, infant stage, the homograft response is in some way altered so that a later challenge of the host with a skin graft from the donor of the injected cells is tolerated—sometimes permanently and at least usually for a much longer time than would occur in the absence of pretreatment. The authors developed a technique which allows the cross injection of blood between large numbers of chick embryos. The highest incidence of long-term graft survival occurred in chicks treated at 12 to 18 days of incubation; the lowest incidence was in newly hatched chicks. None of the preceding work would permit clinical application, although certain aspects of these experiments are provocative of limited clinical considerations. At present, human kidney homografts have been tolerated by the host as long as 5½ months. Compared to the results presently obtained in many palliative cancer operations, even 3 months of efficient palliation afforded by a renal homograft to a patient dying of uremia may be worthy of consideration. If by some means an average palliation of one year could be offered such patients, it would seem proper to offer the procedure.

PEDIATRICS

Two Cases of Listerial Meningitis in Infants. P. N. Edmunds, D. N. Nicholson and D. M. Douglas. Brit. M. J. 2:188-191 (July 27) 1957 [London].

No published case of human listeriosis has occurred in Britain since 1941. In 1956 near Edinburgh 2 infants with listerial meningitis were admitted to a hospital; one was 3 months old, the other 10 days. The first baby was never critically ill during his stay in hospital. Penicillin had been given for 6 days, sulphadiazine for 17 days, and chloramphenicol for 10 days. He was discharged on the 27th hospital day. The second baby came from an unhygienic home. Thirty-six hours after admission he had a generalized convulsion lasting several minutes. He was first treated with streptomycin, then with chloramphenicol. He was discharged on the 35th day. Typing serums were prepared for the identification of the 4 main serotypes and 2 subtypes of Listeria. The strain in the first baby was found to be type 4b, and the one in the second baby was type 2. Type 4 is widespread among different animal species, but the incidence of type 4b, as distinct from 4a, does not seem to have been investigated so far. There were no animals in contact with the first baby, except that a cat had perhaps licked the baby's feeding bottle. No records exist of cats being infected with Listeria monocytogenes. There was no contact between the second baby and any livestock, although there were a dog, mice, and beetles in the house. Apparently no type 2 strain (second baby) has yet been isolated from animals. The possibility of human-to-human infection is suggested by some clinicians. The authors think that there was congenital infection in the second baby because of the short period elapsing between birth and the onset of symptoms.

Investigation of Amino Aciduria in Erythroblastosis Foetalis and Its Possible Relationship to Kernicterus. P. J. Nestel and L. Nestel. M. J. Australia 1:909-911 (June 29) 1957 [Sydney, Australia].

Kernicterus or encephalomyelopathy with jaundice is a postnatal condition in which certain characteristic neurological signs are associated with a deposition of bilirubin in various parts of the brain. This had led to the assumption that the bilirubin was responsible for the cerebral lesions. Evidence is accumulating which suggests that bilirubin per se will stain brain tissue only after the latter has been injured by other factors. This pigmentation of the brain may then be merely fortuitous, and another toxin present in encephalomyelopathy with icterus may be responsible for the underlying brain damage. In recent years the association of liver failure with neuropsychiatric syndromes has been stressed. Many cerebral functions are interfered with, and some of the signs bear a close resemblance to those of encephalomyelopathy with icterus. Ammonia and amino acids have been shown to be present in the blood, the cerebrospinal fluid, and the urine in high concentration in serious liver damage of varied etiology. The amino aciduria may be regarded as of the "overflow" variety.

The authors investigated with the aid of paper chromatography the amino acid concentrations of 8 infants with severe erythroblastosis fetalis (hemolytic disease of the newborn). They found that amino acids were present in considerably increased concentration. Altogether 21 different amino acids were identified, many of which are not found in the urine of newborn infants under normal conditions. It is possible therefore that encephalomyelopathy with icterus is an irreversible lesion produced by one or several nitrogenous substances present in toxic amounts during the stage of liver insufficiency, the areas of necrosis being subsequently pigmented by bilirubin. Such a hypothesis would also be compatible with the prophylactic effect of exchange transfusion.

Chloramphenicol-Tetracycline Treatment of Salmonellosis in Children: Strip-Gradient and Replica Strip-Gradient Techniques as Guides to Therapy. M. M. Streitfeld, M. S. Saslaw and R. B. Lawson. A. M. A. J. Dis. Child. 94:155-168 (Aug.) 1957 [Chicago].

Although chloramphenicol is the drug of choice in typhoid fever and other Salmonella infections, it is often inadequate in that relapses are common, the organisms persist in bile or stools for variable periods of time, carrier states may not be permanently eradicated, and intestinal hemorrhage and perforation may still occur. The authors report investigations carried out to find an additional antibiotic against Salmonella infections. Two of the authors (Streitfeld and Saslaw) had earlier described a strip-gradient technique for testing pairs of antibiotics in various concentration ratios. The authors describe bacteriological and clinical studies performed on patients with salmonellosis in a hospital in Miami, Fla. Strip-gradient studies performed on 45 species and strains of Salmonella demonstrated the in vitro efficacy of combined use of chloramphenicol and tetracycline in inhibiting growth of these organisms. The 45 strains consisted of 29 isolates from stool or blood cultures from patients ill with Salmonella infections (including 5 patients with typhoid fever), 1 isolate from a rat colony epidemic of pulmonary and gastrointestinal salmonellosis, and 15 stock strains of different groups and types of Salmonella.

Replica strip-gradient investigations indicated that the effects of the combined antibiotics were bacteriostatic rather than bactericidal. These in vitro results were used as guides to therapy in 11 human patients (2 with typhoid fever and 9 with other types of salmonellosis), who had failed to respond adequately to prior medication with single

antibiotics or combinations other than chloramphenicol and tetracycline. The 2 children with typhoid fever and 4 with other Salmonella infections were treated because of the persistence of clinical illness; all responded satisfactorily to combined medication with chloramphenicol and tetracycline. Two additional patients were treated with this combination of antibiotics because of failure of chloramphenicol alone, following medication with other antibiotics, to eradicate the organisms from their stools; inadequate follow-up data are available to evaluate combined therapy in these 3 cases. The remaining 3 patients received combined antibiotic medication because of the trial therapeutic regimen in progress, with satisfactory clinical results. Although no final conclusions can be drawn from this small number of patients, the authors believe that their findings warrant further clinical trial of this antibiotic combination.

Nephrosis in the Newborn Infant: A Syndrome Difficult to Explain by Existing Theories of Etiology. F. L. Gruskay and A. Turano. A. M. A. J. Dis. Child. 94:117-122 (Aug.) 1957 [Chicago].

The nephrotic syndrome is characterized by edema, albuminuria, hypoalbuminemia, and hyperlipemia. The characteristic histological lesion consists of thickening and splitting of the basement membrane of the glomerular tufts with secondary tubular degeneration and lipoid deposition. Renal clearance studies have shown variable results in the acute phase of the disease and moderately to greatly diminished function in the chronic stages. The disease is commonest between 18 months and 4 years, although occasional cases are seen in other age groups. The authors present observations on an infant who was born 7 days before the expected date and who weighed only 2,000 Gm. (4.5 lb.). On the 15th day of life edema of the left eyelid and abdominal distention were noted. She was discharged on the following day, weighing 2,330 Gm. (5 lb.). At home, feedings were taken poorly and there was increasing edema, involving both eyelids, legs, and arms. At 23 days of age twitching of the face and extremities was noted. She was hospitalized and was found to have generalized pitting edema, most pronounced on the eyelids, hands, feet, and lower abdomen. There were clonic convulsive movements of the face and extremities. Repeated urinalysis showed 4+ albumin. Renal clearance studies were done repeatedly during the course of the disease, which terminated in death at the age of 8 months.

A poor prognosis was predicted from the increase in the clearance of urinary protein in relation to the glomerular filtration rate as well as an increase in the clearance of protein of larger molecular size. The present theories of the etiology of the disease are discussed. Observations on this infant contradict several possible mechanisms of the etiology of the nephrotic syndrome in the newborn infant that have been suggested, such as pneumococcic and streptococcic infections, poststreptococcic diseases, pyelonephritis, congenital anomalies, and renal vein thromboses. Furthermore, the concept of autogenous circulating antibody formation leading to progressive disease as a cause of nephrosis may not be applicable in the newborn infant in light of the data, which indicate essentially an immunological paralysis through the first several months of life.

Hemodialysis in Children: Report of 5 Cases. F. H. Carter Jr., S. Aoyama, R. D. Mercer and W. J. Kolff. J. Pediat. 51:125-136 (Aug.) 1957 [St. Louis].

Four boys between the ages of 2 and 14 years and one 5-year-old girl with renal failure were treated with the artificial kidney. The rotating type of artificial kidney was used for 1 patient and the disposable coil kidney was used for the other 4. The latter type of artificial kidney proved to be an effective dialyzer, requiring a minimum of time for preparation and being easily operated. One hemodialysis was performed in 3 patients, 2 hemodialyses in 1, and 3 hemodialyses in 1. No alarming changes occurred in these 8 dialyses. Four patients survived. One patient improved temporarily, but convulsions led to the patient's death 13 days after the hemodialysis was performed. The causative factors that led to renal failure were a transfusion accident in 1 patient, shock secondary to meningococcic septicemia in 1, chronic glomerulonephritis with necrotizing arteriolitis in the 1 patient who died, and what appeared to be acute glomerulonephritis in 2.

A state is reached in severe uremia in which conservative procedures become inadequate. Early and frequent hemodialysis promotes an improvement in sensorium, a return to the feeling of well-being, and a return of appetite. Catabolic retention products are reduced, a relative restoration of electrolyte equilibrium is obtained, and the total amount of body water is lessened. Clinical improvement after hemodialysis was evident in all 5 patients, and clinical management became easier. Hemodialysis in the hands of a well-trained team is not only helpful in producing a smoother course in children having renal failure but may also be lifesaving.

Generalized Cytomegalic Inclusion Disease. A. E. McElfresh and J. B. Arey. J. Pediat. 51:146-156 (Aug.) 1957 [St. Louis].

The authors report 3 male infants in whom the diagnosis of cytomegalic inclusion disease was established during life. The most severely affected infant died at 1 year of age. Autopsy revealed hydranencephaly with cerebral calcifications and the presence of small numbers of inclusion bodies in Brunner's glands, kidneys, submaxillary gland, and thyroid. Focal infiltrates of lymphocytes in

several viscera such as bronchioles and myocardium were noted and may have represented a reaction to preexisting inclusion-bearing cells. The 2 surviving infants had reached the age of 26 and 35 months, respectively, when the paper was published. Their mental and motor development has been retarded but has revealed considerable scatter, and the degree of retardation has not been striking. Inclusion bodies were still demonstrable in the urine of 1 of these infants at the age of 11 months. Similar cells were present in small numbers in renal tubular epithelial cells at the time of autopsy in the infant who died. The diagnosis may be established by examination of smears of the urinary sediment several months after birth. The younger of the 2 surviving patients had an apparently normal vocabulary, used simple sentences, built a tower of blocks, and passed the form board portion of the developmental examination according to the technique of Gesell. His only neurological abnormality was a wide-based, slightly ataxic gait. These findings suggest that the disease is not always associated with severe mental and motor retardation.

Hereditary Ectodermal Dysplasia of the Anhidrotic Type. R. Bowen. South. M. J. **50**:1018-1021 (Aug.) 1957 [Birmingham, Ala.].

Nearly 100 patients have been reported with hereditary ectodermal dysplasia of the anhidrotic type, including 4 Negro children. All of the group were males except for 4 girls. The patients resembled each other to a remarkable degree because of their unusual facies, characterized by high wide brows, a depressed nasal bridge, thick lips, and a "Popeye-the-sailor" type facial contortion. Cardinal highlights of the condition include heat intolerance due to generalized absence of sweat glands, partial to complete absence of both deciduous and permanent teeth with deformity of those which are present, and a decreased number of hair follicles and sebaceous glands as shown by a dry, smooth, shining skin or papillary lesions on the face with surrounding acanthosis and absent or sparse fine dry hair. These cases are further characterized by hyperpyrexia, especially during the summer months, and a persistent malodorous nasal discharge. Other disturbances are atropic rhinitis, myopia, chronic pharyngitis, absence of taste or smell, deformed ears, conjunctivitis, absence of tears, plantar or palmar keratosis, possible absence of mammary glands, everted lips with poor definition of the vermillion border, thickened cranial bones in an otherwise normal skeleton, and mild mental retardation. True anhidrotic ectodermal dysplasia must be differentiated from hidrotic ectodermal dysplasia, Werner's syndrome, Rothmund's syndrome, and the Hutchinson-Gilford type of progeria. It is of note in the reported cases that teachers and playmates were aware of the condition and actively cooperated, thus minimizing the psychological trauma.

DERMATOLOGY

Electrodesiccation of Pigmented Nevi: Biopsy Studies: A Preliminary Report. R. G. Walton, R. D. Sage and E. M. Farber. A. M. A. Arch. Dermat. **76**:193-199 (Aug.) 1957 [Chicago].

One hundred sixty-eight pigmented intradermal and compound nevi were removed from 82 patients by shave biopsy and light electrodesiccation of the bases. Rebiopsy studies to date of 112 lesions from 75 patients were done at 3-month to 12-month intervals. In neither the first nor the second biopsy was there evidence of malignant change, nor was there evidence of changing or metaplastic cell morphology. There was no evidence of increased mitotic activity. Pigmentation of the biopsy sites was a fairly common finding. It was demonstrated in the rebiopsy specimens microscopically, but in no case was there evidence of associated malignant change. Scar tissue was an almost constant finding in rebiopsy specimens, and in 25 completed lesions no remaining nevus cells were found. Nevi treated in this manner are frequently completely removed, and if not the remaining cells are buried in scar tissue.

Shave biopsy combined with light electrodesiccation is a safe procedure, provided initial treatment is accompanied by competent pathological evaluation of tissue removed. Clinical diagnosis of the lesions as pigmented nevi was proved by biopsies to be erroneous in 7.1% of the lesions treated. From the cosmetic standpoint the procedure is highly desirable and avoids unnecessary surgical excision. Though no significant abnormal changes have been seen in this study, a greater time interval and further evaluation of follow-up studies are necessary before any conclusions can be drawn. Because of the greater malignant potentiality, it is recommended that nevi which show growth, darkening, recent appearance, exudation or ulceration, and subjective discomfort should be completely excised. Junction nevi should be excised.

Topically Applied Prednisone and Prednisolone in the Treatment of Selected Dermatoses. G. R. Frolow, W. H. Witten and M. B. Sulzberger. A. M. A. Arch. Dermat. **2**:185-188 (Aug.) 1957 [Chicago].

A group of private patients with various skin diseases, including atopic dermatitis, allergic contact-type eczematous dermatitis, superficial psoriasiform dermatitis, and seborrheic dermatitis, generally responsive to topical hydrocortisone therapy, were treated locally with 2 different lots of prednisone, 2 different lots of prednisolone, and with 1% hydrocortisone as well as with the blank vehicle in which these compounds were incorporated. All the test ointments were prepared and supplied by the same manufacturer. The second lots of prednisone and prednisolone were more

purified. Hydrocortisone and the black vehicle served as positive and negative control respectively. In most of the patients the method of symmetrical paired comparison was used. Each patient was instructed to rub small amounts of the test ointments into the designated areas of the skin 2 or 3 times daily and to take care to avoid contamination of other sites. There was no apparent difference in the therapeutic effectiveness of topically applied prednisone and prednisolone. The 0.5% preparations of the first lots of prednisone and prednisolone, as used under the conditions of this study, were not as effective as the 1% hydrocortisone. The second, more purified, lots of prednisone and prednisolone in 0.5% concentrations were as effective as 1% hydrocortisone. Neither prednisolone nor prednisone was more effective than double its concentration of hydrocortisone.

In 4 of the 13 patients treated with the less purified lots of prednisone and prednisolone the dermatoses became worse both objectively and subjectively. Such worsening has been a rare occurrence with hydrocortisone itself and with the hydrocortisone derivatives previously tested in topical therapy. This untoward effect did not occur in any of the patients treated with the more purified lots of the compound.

THERAPEUTICS

First Results Concerning the Therapeutic Effect of the Antineoplastic Drug E 39. P. Verga and V. Perrone. Riforma med. 71:604-607 (June 1) 1957 (In Italian) [Naples].

The authors report on the results obtained in 22 patients, 16 to 74 years of age, with various types of neoplasia treated with an ethyleneimine quinone (E 39). All patients except 1 with leukemic lymphadenosis, 1 with malignant lymphogranuloma, and 1 with pulmonary carcinoma had been previously subjected to surgical or physical treatment. The drug was injected intravenously in 17 patients and was administered locally in 5. The patients had been fasting 12 hours before they received the injection and fasted for 1 to 2 hours after the injection. A dose of 5 mg. of the drug was administered at the first injection, 7.5 mg. at the second, and 10 mg. at the third and subsequent injections. A lower dose was administered to younger patients. Each patient received an average of 400 mg. of the drug. A dose of 5 to 20 mg. each time was used in patients who were subjected to local administration. The treatment had to be discontinued in several patients because of complications. All of the patients developed leukopenia, some after the 8th to the 10th injections others after the 30th injection. The best results were obtained in patients with a moderately severe form of neoplasia and in fair general condition. The drug had no effect or a poor effect on most of the patients. An antineoplastic effect was observed in 7 patients. Topical administration caused serious disturbances in some patients. The authors think that the drug should be given intravenously to patients with nonsevere neoplasia who are in fair general condition. The drug had a good effect in prolonging the duration of life of one patient only.

Probenecid-Penicillin Allergy: Allergic Mucocutaneous Reactions Following Treatment of Haemolytic Streptococci Infections with Penicillin Preparations Containing Probenecid. J. Ström. Acta paediat. 46:387-395 (July) 1957 (In English) [Uppsala, Sweden].

Of 390 children with scarlet fever in the acute stage and during desquamation and with other diseases caused by hemolytic streptococci 100 were treated with the potassium salt of penicillin G, 120 with potassium salt of penicillin G combined with probenecid (Probecillin), 100 with phenoxymethyl penicillin (penicillin V), and 70 with the potassium salt of phenoxymethyl penicillin combined with probenecid (Vebecillin). The duration of treatment was 14 days. Untoward reactions to penicillin G and phenoxymethyl penicillin did not occur in the 200 patients treated with these drugs. The probenecid-penicillin preparations, however, produced side-effects in 47 of the 120 patients treated with Vebecillin and in 11 of the 70 patients treated with Probecillin. Thus the total incidence of side-effects in the patients treated with probenecid-penicillin preparations was 30.5% (58 of 190 patients), an extremely high ratio as compared to that reported in the literature. The side-effects were of the delayed allergic reaction type. Urticaria occurred in 6 and a maculopapular rash in 52 patients. These rashes were associated with fever in 43 of the 58 patients and with mucous membrane reactions of Stevens-Johnson syndrome (ectodermosis erosiva pluriorificialis) type in 24. A severe reaction of bullous and pseudomembranous type affecting the skin and mucous membranes and associated with high fever and severe conjunctivitis occurred in a 7-year-old girl treated with Vebecillin.

Penicillin and probenecid may both produce delayed untoward reactions, but to not nearly so great an extent as in these patients. There must, therefore, have been an unfavorable combination of drugs from the allergic point of view. The incidence of allergic reactions to the combined treatment with penicillin and probenecid was higher in the patients treated with Vebecillin than in those treated with Probecillin. The incidence of reactions also was higher in patients with scarlet fever than in those with other diseases caused by hemolytic streptococci. This latter finding suggests that the disease treated may have been a contributing factor. Probenecid-penicillin preparations should be used with caution when administered for prolonged periods, particularly in patients with scarlet fever.

BOOK REVIEWS

Blood Pressure Sounds and Their Meanings. By John Erskine Malcolm, B.Sc., M.B., Ch.B. Cloth. $2.50. Pp. 93, with 45 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1957.

The object of the research described in this monograph is the establishment of a physical explanation for the Korotkoff sounds. Some, but not all, of the previous work on this aspect of physiology is here reviewed. In this study, the Korotkoff sounds are related to vibrations of the brachial arterial wall as recorded under a sphygmomanometer cuff while the cuff pressure is slowly reduced toward zero from a level well above the systolic pressure. These vibrations are presumed to represent the brachial arterial pulse wave shape and amplitude. Classical work devoted to the complexities of pulse wave transmission through the systemic arterial tree forms the background of this report. This includes the concepts of standing and reflected waves and the factors that determine them. The relationship of arterial blood flow to blood pressure is also shown to be more complex than is perhaps commonly realized. The Korotkoff sounds are then explained on the basis of systemic arterial resonance. It is stated that resonance occurs in arteries, due to and maintained by impulses from the heart and reflected waves from the periphery, with the result that systems of stationary waves develop in arteries with fixed nodes and antinodes at certain points in the arterial system; and, further, that experimental evidence will be shown to afford proof of the presence of stationary waves in the brachial artery in man, with the occurrence of changes of wave length and alteration of the system of stationary waves, as a result of cuff pressure. Anatomic manifestations of systemic arterial resonance are presented, and these are of great interest. The concepts of "cavitation" and "water hammer" are also introduced; these appear to play a role in the production of the sounds.

The approach is thus largely general and indirect. The Korotkoff sounds are not related to directly recorded brachial arterial pressure pulses, nor does the author comment on factors responsible for the lack of a precise or predictable relationship between the Korotkoff sounds and directly recorded brachial arterial blood pressure. There is no detailed discussion of the variations in these sounds as related to pathological states of the arterial wall, or of the circulation as a whole, as for example in aortic insufficiently. These aspects are perhaps beyond the scope of the book, but explanations for such observations as the occasional absence of the third (diastolic) sound are provided. Much of the presentation is controversial, and many views expressed will be sharply criticized by other workers in the field. This provocative work is probably beyond the scope of most clinicians. It is of interest as a contribution toward better understanding of the Korotkoff sounds, which are so widely and confidently used as clinical data. The style of writing and the format of the book are pleasing.

Peripheral Circulation in Health and Disease. By Walter Redisch, M.D., F.A.C.P., Associate Professor of Clinical Medicine, New York University College of Medicine, New York, and Francisco F. Tangco, M.D., B.S., Assistant Professor of Medicine, University of Philippines Medical School, Manila. With special section by R. L. deC. H. Saunders, M.D., F.R.S.E., Professor and Head of Department of Anatomy, Dalhousie University Medical School, Halifax, Nova Scotia, Canada, and associates. Cloth. $7.75. Pp. 154, with 25 illustrations. Grune & Stratton, Inc., 381 Fourth Ave., New York 16; 99 Great Russell St., London, W. C. 1, England, 1957.

This challenging and stimulating monograph on peripheral circulation is addressed to a variety of readers. The first four parts of the volume deal with basic aspects of peripheral blood flow, pathological alterations in peripheral blood flow, physiological responses to disturbances in blood flow, and therapy. This highly systematized and compressed account of knowledge is adequately supported by references to the literature in which medical students or graduate students interested in vascular disease may find a concise summary of present knowledge. The authors supply little if any information to the practitioner of medicine as to procedure except through references, giving a rather skeletonized description of diagnosis and management. Thus they mention paravertebral blocks or arteriography as something highly technical, to be read about in some other source, whereas they supply beautiful photomicrographs taken by electron-microscopy.

The main interest of the authors lies in the responses of blood vessels to varied stimuli, including drugs. Their only reference to the treatment of congenital vascular anomalies is an article by Dean D. Lewis, published in *Lancet* in 1930. Through the entire monograph, there runs not only sane conservatism but a "horror chirurgiae" hardly justifiable in the light of recent advances in vascular surgery.

These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

The final chapter, written by Professor Saunders, is concerned with the radiographic visualization of muscle circulation by microarteriographs, a technique fruitful in other regions of the body but not previously applied to the circulation of muscles. The author here demonstrates conclusively what had been postulated by Barcroft on the basis of physiological observation; that an elaborate mesh of arteriovenous shunts, preferential channels, and bypasses exists in skeletal muscle. This explains many discrepancies between the measurements of blood flow and the clinical state of the patient. As the author says, "The anatomy of the peripheral circulation of man has not been greatly extended since the time of William Harvey, nor has sufficient attention been paid to vascular areas intermediate between the grosser and the microscopic vessels." This chapter should be read by everyone who has any interest in circulation, whether this interest be in shock, burns, or hypertension.

Systemic Arterial Embolism: Pathogenesis and Prophylaxis. By John Martin Askey, M.D., Associate Clinical Professor of Medicine, University of Southern California School of Medicine, Los Angeles. Modern Medical Monographs 14. Cloth. $5.75. Pp. 157, with 22 illustrations. Grune & Stratton, Inc., 381 Fourth Ave., New York 16; 99 Great Russell St., London, W. C. 1, England, 1957.

This monograph reviews in an orderly fashion the problem of embolism of peripheral arteries. The basis for the review is an extensive bibliography citing almost 300 references. The statistics bearing directly on the problem of embolism are all derived from these articles. The book also deals with the various forms of heart disease which are described as being the major causes of arterial embolism in the chapter Differential Diagnosis of Heart Disease. The fact that the condition of a high proportion of patients with rheumatic heart disease goes without accurate diagnosis during life is pointed out. Major arterial embolism may be the first sign of mitral stenosis, and careful search in such patients should disclose the underlying cause of the arterial accident. Parts of this chapter appear to be somewhat beside the point. Other sections dealing with rheumatic fever and its relation to prophylactic anticoagulant therapy are excellent. A large proportion of the volume is devoted to anticoagulants. The practical use of bishydroxycoumarin as a prothrombin depressor is thoroughly presented. The place of heparin in acute embolism is mentioned but not described. Each of the nine chapters is summarized in a most helpful fashion.

The relationship between peripheral arterial embolism and current operations on the mitral valve for stenosis is mentioned repeatedly in regard to indications for operation, in comparison to anticoagulant therapy, and the results of mitral valve operations on the incidence of embolism. The surgical treatment of the peripheral arterial embolus is only briefly mentioned. The reader is left with the impression that the author favors embolectomy in most circumstances over so-called conservative nonsurgical treatment. The monograph is well written and provides information on all aspects of its subject. Its value should be greatest to the general practitioner in giving a firm understanding of arterial embolism and to the internist in providing source material on this subject. The accuracy and completeness of the index is deficient, making it somewhat difficult to locate discussions of single aspects of the problem.

The Clinical Aspects of Arteriosclerosis. By Seymour H. Rinzler, M.D., F.A.C.P., Associate Physician, Beth Israel Hospital, New York. Cloth. $8.75. Pp. 339, with 57 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

This book brings together much of the current knowledge of the clinical problems of arteriosclerosis. It deals in detail with the diagnosis and treatment of arteriosclerosis of the coronary, cerebral, and peripheral arteries and of the aorta. The fact that the section on coronary artery disease occupies about one-half the text reflects not only the importance of this aspect of arteriosclerosis but the relative lack of information on arteriosclerosis in other vascular beds. Even though the author states that arteriosclerosis of the cerebral arteries is the second commonest cause of death due to vascular disease, the section dealing with cerebral arteriosclerosis is comparatively short. Nevertheless, the various clinical syndromes due to occlusions of particular cerebral arteries are well defined. Treatment of these is not discussed in detail. This seems unfortunate, since the socially and physically crippling effects of a stroke can be major problems to the patient, his family, and his physician, all of whom may feel baffled and helpless. In a sense, it is better at this time for a patient to suffer the complications of coronary than of cerebral arteriosclerosis, since the treatment of myocardial infarction is better organized.

The opening chapter surveys incidence, pathology, pathogenesis, the possible role of lipid abnormalities, the relationship of diet to arteriosclerosis, and the accelerating effects of hypertension and diabetes; it also attempts to give some of the experimental background. Because of its scope, it fails to give a critical appraisal of current views. The present intense interest of physicians in the relationship of diet to arteriosclerosis will not be satisfied by the rather indecisive discussion, which fails to point up many of the fallacies inherent in some of the recent epidemiologic studies. Criticism aside, this is a timely, valuable book on an important subject. It should interest and be of help to physicians

faced with the diagnostic and therapeutic problems of arteriosclerosis. Should it go into a second edition, the defects can be easily remedied. The publisher is to be congratulated on the make-up of this volume.

Chronic Illness in the United States. Volume I: Prevention of Chronic Illness. By Commission on Chronic Illness. Cloth. $6. Pp. 338. Published for Commonwealth Fund by Harvard University Press, Cambridge 38, Mass.; Oxford University Press, Amen House, Warwick Sq., London, E. C. 4, England, 1957.

The control of chronic illness is one of the major problems facing American medicine. Long-term disorders have risen sharply in frequency as one after another of the various acute diseases, particularly those resulting from infections, nutritional deficiencies, and faulty sanitation, have receded. The Commission on Chronic Illness was founded in 1949 by the American Hospital Association, the American Medical Association, the American Public Health Association, and the American Public Welfare Association. In addition to these founder groups, many influential organizations and many individuals have supported this work. The results of seven years of intensive study are now being made available.

This first volume presents the conclusions of the Commission with emphasis on prevention. Part 1 outlines 21 conclusions and recommendations which the Commission adopted in February, 1956. Part 2 outlines the summaries on the preventive aspects of the most common long-term diseases. Most of the summaries have a satisfactory, but not complete, bibliography. This scholarly and carefully documented report should receive wide distribution and acceptance. It is a milestone in the search for more effective means for the control of chronic illness. The highlights of the various diseases are analyzed with particular focus on control, where possible, before serious impairment occurs. The recommendations, which include a reorientation of medical education with more attention being directed to positive health, should be carefully studied by medical faculties throughout the nation. There are five appendixes and an excellent index. This book is highly recommended.

Medical Radiation Biology. By Friedrich Ellinger, M.D., Chief Radiation Biologist and Head Pharmacology Division, Naval Medical Research Institute, Bethesda, Md. Cloth. $20. Pp. 945, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

This book represents a digest, in the best sense of that word, of an immense body of published facts about the effects of radiations on the human and animal body. About 500 pages are devoted especially to the ionizing radiations, about 60 to ultraviolet radiation, and about 20 to visible and infrared radiation. Of special interest are the detailed, concrete summaries of effects of ionizing radiations on skin, gonads, and blood-forming organs; the discussion of the acute syndrome following whole-body radiation; the chapter on neoplasms and allied diseases; and the compact statements regarding the action of radioactive isotopes introduced into the body to irradiate tissues from within. A chapter on ionizing radiations as a health hazard calls attention to some neglected sources of danger and gives quantitative facts regarding the effects of cosmic rays at sea level and at high altitudes.

The distinctive feature of this book is not so much the gigantic bibliography as the care with which all the information has been assimilated into a readable textual continuum. Each reference is represented in the proper place by a coherent, brief statement of its content. There is no alphabetical subject-index, but the extensive table of contents makes it easy to locate any desired subject. The references to publications in German, French, and other foreign languages are unusually accurate. The book can be recommended both as interesting reading for physicians in general and as a key to existing literature for radiologists and biophysicists.

Clinical Orthopaedics. Number Nine. Anthony F. DePalma, editor-in-chief. With assistance of associate editors, Board of Advisory Editors and Board of Corresponding Editors. Cloth. $7.50. Pp. 353, with illustrations. J. B. Lippincott Company, 227-231 S. Sixth St., Philadelphia 5; 4865 Western Ave., Montreal 6, Canada; Pitman Medical Publishing Company, Ltd., 45 New Oxford St., London, W. C. 1, England, 1957.

This volume maintains the level of excellence of the previous volumes in this series. The first article, by LeRoy A. Abbott, is a dedication to Dr. John Albert Key. To those who knew Dr. Key this short summary of his life expresses very well the general qualities of his outstanding personality, and, as the author says, "His death left a great void in the lives of his host of friends and colleagues." The first section of the book is a symposium on the pathological physiology of metabolic bone disorders, and each of the 11 chapters is well written. As in the previous volumes, the photographs and charts are easily understood. The second section deals with general orthopedic problems and, as in previous volumes, the third part of the book is devoted to motorist injuries and motorist safety. These articles should be read not only by surgeons dealing with trauma but also by those associated with the design and manufacture of automobiles. The article on the role of safety belts should be carefully studied. This article questions the advisability of making safety belts standard equipment without more conclusive research studies.

QUERIES AND MINOR NOTES

SCREENING FOR ADRENAL HYPERFUNCTION

To the Editor:—*Kindly outline a screening procedure to be used on those patients exhibiting some of the features of adrenogenital or Cushing's syndrome where adrenal hyperfunction is suspected. Please list criteria which constitute sufficient evidence for further investigation and surgery if indicated.*

Stanley B. Covert, M.D., Kingfield, Maine.

Answer.—One of the most significant diagnostic aids in deciding whether a patient has adrenal hyperfunction with resulting Cushing's syndrome is to compare all previous photographs with current ones. The changes in fat distribution can usually be readily differentiated. Important clinical features of the obesity include fulness of the upper third of the body. The face is usually round or moon-shaped, and there is also a drooping of the corners of the mouth, giving the appearance of the so-called fish mouth. There is an increased deposit of fat over the cervical region, giving the buffalo-hump appearance, and the supraclavicular fossae also contain an excessive amount of fat. Usually there is a tendency toward girdle obesity, with some wasting of the lower extremities. The complexion is ruddy, and the degree of acne, virilism, and hirsutism is not as pronounced as it is in the adrenogenital syndrome. Striae may or may not be present. When present, they are purplish in color and are found in the axillas as well as the lateral lower quadrant of the abdomen. A patient with Cushing's syndrome complains of weakness.

In the patient with the adrenogenital syndrome, the musculature is very heavy and has a masculine appearance and distribution. There is no redistribution of fat. Hirsutism, acne, and virilism are more pronounced, and the voice is deeper. There is no complaint of any weakness. Simple laboratory procedures are helpful but are not diagnostic. The white blood cell count in Cushing's syndrome is normal, with the exception that there is an increase in the number of polymorphonuclear cells and the total eosinophil count is low. In the adrenogenital syndrome the white blood cell and differential counts as well as the eosinophil count are normal. In Cushing's syndrome there is usually some carbohydrate intolerance, as manifested by either frank diabetes or diabetic type of glucose-tolerance curve. Hypertension is common in patients with Cushing's syndrome. In the adrenogenital syndrome, hypertension and diabetes seldom exist.

Osteoporosis is a rather frequent finding in Cushing's syndrome, but it does not occur in the adrenogenital syndrome. The presence of osteoporosis is of diagnostic significance, particularly in a young person with normal blood calcium, phosphorus, and alkaline phosphatase. Pyelography is rarely of any assistance in the diagnosis of Cushing's syndrome, and it has no value in the adrenogenital syndrome. Perirenal or retrosacral air insufflation is of little help, even for lateralization of a tumor in Cushing's syndrome, and has no value where adrenal hyperfunction due to hyperplasia occurs.

The measurement of hydrocortisone and some of its metabolites in the blood and urine is helpful in distinguishing between the adrenogenital syndrome and Cushing's syndrome where the clinical features may overlap. The urinary 17-ketosteroids are always above normal in the adrenogenital syndrome, whereas in Cushing's syndrome they may be low, normal, or elevated. In Cushing's syndrome, the 17-ketosteroids are slightly elevated in adrenal hyperplasia; they are low where a tumor exists and are often high where there is carcinoma. The urinary 11-oxysteroids are low in the adrenogenital syndrome and are either normal or above normal in Cushing's syndrome.

The administration of corticotropin (ACTH) to patients with the adrenogenital syndrome results in an additional increase in the elevated urinary excretion of 17-ketosteroids, and the administration of cortisone, hydrocortisone, or fludrocortisone causes a decrease in the urinary secretion of 17-ketosteroids. This contrasts with Cushing's syndrome, in which there is no change in the secretion of 17-ketosteroids after such therapy. The plasma and urinary 17-hydroxycorticosteroids are often elevated in Cushing's syndrome and are below normal in the adrenogenital syndrome. After the administration of corticotropin there is usually a marked rise in both the plasma and the urinary values in Cushing's syndrome. The administration of corticotropin in the adrenogenital syndrome produces no appreciable rise in the urinary or plasma levels.

The adrenogenital syndrome can be treated with the oral use of cortisone, hydrocortisone, and their derivatives; however, the intramuscular route is sometimes necessary to obtain 24-hour suppression

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any medical or other organization unless specifically so stated in the reply. Anonymous communications cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

of the pituitary production of corticotropin. In Cushing's syndrome, surgical exploration is mandatory when the diagnosis is established. Preoperative and postoperative surgical care requires the use of large amounts of cortisone or hydrocortisone.

LARYNGOSPASM DURING THROAT EXAMINATION

To the Editor:—*Is it all right to press down the tongue of a child to examine his throat? Recently this was done to a boy, and he became quite cyanotic. After a minute or so, with a few slaps on the back, his color returned.*

M.D., New York.

Answer.—The difficulty with this patient may be a matter of semantics. If the term "tongue depressor" were to be changed to "tongue elevator," less difficulty of this type might be encountered. When the tongue depressor is used, the tongue should not be pushed back into the glottis; rather, the base of the tongue should be lifted up and brought forward so as to expose this area for inspection. Unquestionably, the patient had a mild laryngospasm.

COATING OF TONGUE

To the Editor:—*A 55-year-old man states that for six months he has had a thick white coating on the posterior portion of his tongue. He scrapes off what he calls "granular material" with a spoon. Please make suggestions as to diagnosis and treatment.*

Alfred J. Berger, M.D., New Britain, Conn.

Answer.—The coating or furring on the tongue is not a sign of any specific disease. It is often associated with several conditions. Infections of the mouth and respiratory tract, even when not accompanied by fever, may be responsible for furring; mouth breathing, tobacco smoke, and febrile conditions are also associated with furring, but not gastrointestinal disease unless there is an accompanying fever.

Answer.—The epithelium of the tongue is constantly renewed and the desquamated outer layers are removed by its normal activity and environment. During the night when the activity of the tongue is greatly decreased, there is a tendency for a coating to develop. This coating usually disappears in the morning with resumption of greater activity on the part of the tongue, such as eating and talking. On this basis any decrease in oral activity due, for example, to a painful oral lesion may produce a coated tongue. The same may happen when there is a decrease in the moisture of the mouth caused by mouth breathing, diminished flow of saliva, or dehydration.

Another cause of coating of the tongue is alteration of the oral bacterial flora by antibiotics. When patients are given antibiotic drugs, particularly penicillin or chlortetracycline, the susceptible organisms in the oral flora are greatly diminished in number, permitting the resistant organisms to flourish and to alter the normal environment of the tongue. This is also known to occur lower in the gastrointestinal tract.

A third type of coated tongue is produced by functional or organic disturbances of the digestive tract, which lead to reversed peristalsis and the deposition of small particles of partly digested food from regurgitated gastric contents. Such regurgitation can take place at any time but is particularly likely to occur during the night when the individual is in the prone position. This type of coated tongue is sometimes called "worried" tongue. It can be detected by swallowing at night a gelatin capsule filled with lycopodium seeds and looking the next morning under the microscope for the characteristic seeds in scrapings from the tongue.

The most effective treatment of coated tongue consists in correction of the underlying local or systemic condition. If this is not known, the tongue can be scraped, e. g., with a toothbrush. In addition, normal oral activity and hygiene should be promoted. In stubborn cases a 10% alcoholic solution of salicylic acid followed by 3% hydrogen peroxide may be tried.

COLD HYPERSENSITIVITY

To the Editor:—*An 18-year-old girl, in otherwise normal health, developed an acute generalized allergy to cold 17 months after freezing both hands to the point of temporary loss of nails. Tests show that cold agglutinins are not present; smear of the Buffy layer is equivocal for abnormal cells; bone marrow is normal; cryoglobulin has not yet been obtained. Administration of antihistamine and prednisolone has not minimized the typical flare, pallor, edema, and cyanosis. Is there any prospect of desensitization or remission?*

Ivan R. Elder, M.D., Columbus, Ga.

Answer.—If this is a true instance of cold hypersensitivity, antihistamines are expected to relieve, or at least modify, the symptoms. The doses of the antihistamines may need to be large, and their sedative effects may require neutralization with stimulants (Ritalin, Dexedrine, or ephedrine).

Histamine injections have been used for this condition. There is no evidence that one desensitizes to histamine or that the tolerance to histamine is increased after such treatment. Perhaps those injections do something to induce better function of the vascular structures. The histamine injections are given at first once or twice a day, and later less frequently. The initial dose is small, about 0.1 cc. of 1:100,000. This is gradually increased, but the

maximum dose is kept below that which usually gives a histamine reaction (0.1 cc. to 0.5 cc. of 1:1,000).

Another method of treatment is a systematic exposure to cold. This is done either by daily baths, which are gradually made colder from day to day, or by exposure of a limited part of the body (in this case the feet and legs) to fairly cold water for about four minutes, followed immediately by exposure to warm water or other source of heat. Remissions occur not infrequently.

SUBCUTANEOUS NODULES

To the Editor:—*A boy, aged 11 years, first developed a subcutaneous nodule on the dorsal surface of the left forearm, near the elbow, 15 months ago. He had no symptoms or signs of systemic illness at that time. Biopsy* in toto *revealed the histological picture of a rheumatic nodule. The pathologist described granulomatous aggregates, with central necrosis, surrounded by epithelioid histiocytes, the basic structure of the lesion being collagen necrosis of the fibrinoid type. At that time the erythrocyte sedimentation rate was 12 mm. per hour, the white blood cell and differential counts were normal, there was no anemia, and C-reactive protein was absent. It was ascertained that the boy's mother and maternal aunt had had rheumatic fever; there was no family history suggestive of rheumatoid arthritis. The boy denied any trauma or puncture wound of this area. His condition was closely observed for several months and was maintained with penicillin despite the lack of clinical evidence of rheumatic disease. After he was released from close observation, instructions were issued for him to report promptly any illness accompanied by fever or sore throat. At the time of writing he has returned with two additional nodules in the same location. Again, there is no evidence of systemic disease, and the laboratory examinations are once more noncontributory. The sedimentation rate is 3 mm. per hour, the C-reactive protein test is negative, and the antistreptolysin-O titer is 1:160. Should this boy be considered to have actual (or potential) rheumatic fever? Is there any disease, other than rheumatic fever and rheumatoid arthritis, which gives rise to rheumatic nodules?*

Harry D. Baernstein, M.D., Racine, Wis.

Answer.—Subcutaneous nodules of rheumatic fever usually accompany a severe rheumatic fever process. In the absence of any of the other criteria, this child fails to fulfill the necessary requirements according to the Jones formula for the diagnosis of rheumatic fever—either two major manifestations or one major and two minor manifestations. Therefore, it is not felt that this patient requires any prophylaxis against rheumatic fever. Nodules that appear in the course of rheumatic fever are usually multiple. When they appear on the arm they are usually around the olecranon process; they are rarely found on the back of the forearm alone.

Since these nodules of rheumatic fever are thought by many to be an allergic response, other nodules, secondary to some other allergy, may also cause a similar picture. It would be interesting to see whether the new nodules have the same pathology. Perhaps cultures can be made at the same time.

TREATMENT OF KELOIDS

To the Editor:—*Recently there was occasion to treat a severe large keloid around the ankle and foot of a boy, 10 years of age, which had resulted from burns. Each of these areas was given 700 r of deep x-ray therapy, and there was a definite improvement of perhaps 40%. Hyaluronidase solution has also been used. The patient has been warned against the use of too much soap, sunshine, or anything that would tend to dry his skin excessively; in addition, he is keeping the skin well lubricated. Because of fear in using further x-ray therapy, please make suggestions regarding treatment of such a keloid.*

M.D., Alabama.

Answer.—The treatment of keloids produced by burns is frequently unsatisfactory. In many instances, however, time alone produces considerable softening and decrease in the size of the lesion. Since roentgen therapy has been given in this case, it is perhaps wise to give no more. Incidentally, roentgen therapy is only of value to those lesions that show color and vascularity. It is of little or no value to the lesions that are avascular. If the lesion is suitable for excision and primary suture, this would be the next therapy of choice. Excision with skin grafting is recommended only when there is marked disability and pain.

Other treatments have included the intrakeloidal injection of hyaluronidase. A total of 150 turbidity reducing units is injected into multiple sites, so that the entire extent of the lesion has been infiltrated. This may be done once or twice weekly and continued until the lesions soften. Results from this method of treatment are not completely satisfactory.

Hydrocortisone solution (Compound F) may also be injected into the substance of the keloid (Asboe-Hansen and others: *A. M. A. Arch. Dermat.* 73:162-165 [Feb.] 1956). This type of treatment requires a sterile solution, 25 mg. per milliliter, and this is injected intrakeeloidally into multiple areas every one to three weeks. The doses used by Asboe-Hansen and associates varied from 35 to 725 mg., the individual doses being limited by the size and consistency of the keloids. These authors reported that of 56 keloids treated with injections of hydrocortisone 51 were softened and flattened. In 32 cases the keloids disappeared, leaving no remnant or only negligible firmness to palpation.

The technique of dermabrasion is said to give beneficial results. However, in the few instances in which this has been done by this consultant, the results have been unsatisfactory. It is agreed that no further roentgen therapy should be given unless the lesion can be excised and primary suture carried out. In this event, as soon as early healing takes place, the areas may be given further roentgen therapy.

EFFECT ON FETUS OF MOTHER TAKING A DIURETIC

To the Editor:—*A 48-hour-old infant was seen because of moderate elevation in the temperature and lethargy. Careful physical examination was entirely within limits of normal except for moderate signs of dehydration, consisting primarily of poor tissue turgor, dry mucous membranes, thick tenacious saliva, and somewhat depressed anterior fontanel. After two days of clysis the child seemed to be much improved, was afebrile, and was nursing well. It was discharged with its mother and has since done very well at home. The blood culture and the blood cell count were both normal. This infant's mother had been taking acetazolamide (Diamox), 0.25 Gm. a day for a period of about three weeks up to the date of her delivery. Could this medication cause dehydration in an apparently otherwise normal newborn infant?*

C. Herbert Crane, M.D., Sidney, N. Y.

Answer.—Acetazolamide is chemically similar to the sulfonamides, but it is a far more potent inhibitor of carbonic anhydrase. The inhibition of this enzyme in the kidney results in a greater loss of fluid and electrolytes in the urine than would otherwise occur, and this effect is conducive to acidosis and dehydration. Molecules of the size and chemical configuration of acetazolamide are known to be transferred across the placenta into the fetal circulation. It seems quite possible that this medicament, given as indicated, could produce dehydration in an otherwise healthy newborn infant by the following three mechanisms: 1. The fluids and electrolytes of the fetus are in equilibrium with those of the mother. The increased maternal loss of electrolytes and fluids produced by acetazolamide would probably cause some shift of these substances out of the fetus. 2. There is also the possibility of some effect of acetazolamide on renal function of the fetus in utero, causing a loss of sodium and other electrolytes into the amniotic fluid. 3. Subsequent to birth there would presumably be an effect of any acetazolamide remaining in the infant upon its renal function.

Several articles have appeared in which the administration of acetazolamide has been described as reducing the edema of pregnancy, but none has mentioned any effect on the fetus. The schedule and amount of the drug administered, as well as the diet and acid-base balance of the patient, are all factors that would influence the extent to which acetazolamide might influence hydration of the fetus at term.

BLOOD SUGAR TEST RESULTS AFTER BLOOD HAS BEEN STANDING

To the Editor:—*Is the result of a blood glucose test changed if oxalated blood is left standing (or refrigerated) for any period of time before making the determination?*

S. Theodore Sussman, M.D., New Rochelle, N. Y.

Answer.—Glucose is subject to rapid destruction in blood after removal from the vein due to enzymatic action and is related to the temperature at which the blood is held. At 37 C the glucose in blood is virtually exhausted in six hours, and at room temperatures as much as 10 mg. per 100 ml. is lost per hour. Even in the icebox significant amounts disappear overnight. The enzymes chiefly responsible for glycolysis appear to be resident in the erythrocytes, since their removal almost completely inhibits the process. Protein-free filtrates of blood are entirely free of glycolytic enzymes and may be kept indefinitely without alteration of their glucose values. If blood cannot be analyzed immediately or after a short period of refrigeration, it can be preserved by the addition of sodium fluoride, which is both an antienzyme and an anticoagulant. Since, however, its anticoagulant action is neither permanent nor reliable, it is best to utilize the fluoride only for its antienzymatic action and to depend on potassium oxalate to prevent clotting. For this purpose 4 mg. per milliliter of blood of the following mixture is used: 10 parts of sodium fluoride, 3 parts of potassium oxalate, and 1 part of thymol. All parts are by weight. It must be remembered, however, that the antienzymatic action of sodium fluoride renders blood containing it unsuitable for the determination of urea by the urease method.

VIRGINAL BREAST HYPERTROPHY

To the Editor:—*A 13-year-old girl, 5 ft. 4½ in. (164 cm.) tall and weighing 120 lb. (54.4 kg.), noted that her normally large breasts began to show marked reddish-pinkish, wide striae, which ran from the periphery toward the nipples radially, in large numbers, and on both breasts. This condition occurred prior to her first menstruation. What is the cause of this development? Could it have been prevented? What can be done at present? Will these striae disappear without leaving any kind of scars?*

Egon E. Lustig, M.D., New York.

Answer.—Rapidly enlarging breasts will show pinkish striae caused by the stretching of thin skin with relatively poor protein matrix. Such breast development in young women is an expression of exaggerated end-organ responsiveness to endogenous estrogen. This response may be excessive in either rate or degree of growth. When the breasts become so large as to be discommoding, tender, and disfiguring, the condition may be referred to as virginal breast hypertrophy. One of the factors contributing to the breast enlargement is

generalized mammary interstitial edema. Two forms of therapy have been found useful—diuretics and hormones. Should diuretics alone prove inadequate, then hormonal therapy may be tried. It is felt by some investigators that a dampening action on rapid breast development may be obtained with the use of progesterone or progesterone-like compounds. The administration of ethisterone (10 mg. to 50 mg. per day from day 15 to day 25 of each cycle for several months) may prove beneficial. The striae, in all probability, will become blanched without leaving scars, as arrest or regression in breast development is affected.

DISEASES FROM INGESTION OF RAW LIVER

To the Editor:—*This inquiry concerns the use of raw calf's liver, taken either as such or disintegrated by means of a grinder and blender. The liver is fresh and has not been frozen although it is kept in a refrigerator. There was a time when liver, fried only very lightly, was taken in rather huge amounts by patients with pernicious anemia; apparently no ill-effects were observed. The organs were obtained from supervised slaughter houses. What risk would be incurred if liver was obtained from locally butchered animals? Which, if any, infectious diseases can possibly be transmitted through the ingestion of such liver?*

M.D., New York.

Answer.—In order for a disease to be transmitted by the ingestion of raw calf's liver, it is necessary that viable virulent organisms be present in the liver in adequate numbers. There is little risk if the livers are derived from locally butchered animals obtained from known herds which are free from signs of brucellosis and which have been tuberculin-tested. Lesions of tuberculosis would also be easily detected in infected livers and they would be rejected. In general, the possibility of transmission of an infectious disease under the conditions described is very slight. In addition to infectious disease, the possibility of transmission of parasites, such as flukes, must be considered.

RADIATION AND LUMINOUS PAINT

To the Editor:—*Is there any radiation hazard from the long-time use of bedroom slippers having a luminous-paint patch sewed in the insole?*

Orville S. Walters, M.D., Danville, Ill.

Answer.—Luminous paint is not necessarily radioactive. There are luminous paints available which absorb ambient light during the day and then glow at night. It is impossible to know from the description whether the particular slippers mentioned were painted with a nonradioactive or a radioactive paint. If the paint contained a radioactive material, there is little question that there might well be a radiation hazard from the long-time use of the bedroom slippers. Without measurement, however, it would be impossible to know whether the paint were radioactive or what was the exact amount of radioactivity. Over a period of years close skin contact with a radioactive material might cause damage to the skin and, dependent upon the type of radiation, might or might not cause damage to the underlying structure.

MUSCULAR WEAKNESS AFTER STREPTOCOCCIC INFECTION

To the Editor:—*A 34-year-old woman and her two children were stricken with what was originally thought to be a severe streptococcic pharyngitis. Throat cultures were positive for alpha streptococci. The children made an uneventful recovery with penicillin therapy. The mother, on the other hand, developed a diffuse macular scarlatiniform rash and then a generalized muscular weakness. The rash persisted for approximately six weeks. The muscular weakness responded to neostigmine (Prostigmin) bromide. However, the patient is still running daily temperatures of 99 to 100 F (37.2 to 37.7 C), and she still has some soreness and red streaking of the posterior pharynx. Blood cultures, repeat chest films, and repeat urinalyses have all been normal. The patient has been treated with broad-spectrum antibiotics without improvement. Inasmuch as she is a native of Texas, the possibility of a rickettsial disease has been entertained. Please comment on this case.*

T. M. O'Connor, M.D., San Francisco.

Answer.—The clinical findings and history do not suggest a rickettsial disease, and it is unlikely that either Rocky Mountain spotted fever or typhus is responsible. The course is too prolonged for these rickettsioses or for other milder rickettsial infections which are endemic in the United States. Serologic studies, including the Proteus agglutination and complement-fixation tests, would be helpful. It is not possible to arrive at a definite impression from the data at hand, but, in addition to myasthenia gravis, a connective tissue disorder, including rheumatic fever and a sensitivity reaction to penicillin, should be considered.

PROPHYLAXIS OF AMEBIASIS

To the Editor:—*In a query and minor note in* The Journal *for May 25, 1957, page 505, on "the value of the prophylactic treatment of amebiasis with antiamebic drugs," four consultants advocated the use of Entero-Vioform and similar preparations on what seem to me to be tenuous scientific grounds. Several statements both in the query and in the replies may be misleading. Since 1,500,000 Americans will go abroad this year, more than half to areas where the incidence*

of amebiasis is higher than in the United States, authority should not support chemoprophylactic programs which advocate the mass use of drugs that may not be effective and that may have a potential for medical mischief or danger.

The cause of the common diarrhea of tourists in Mexico and other countries is not known, but there is considerable reason to believe that the disease is not amebiasis. The diarrhea, as a rule, is brief and self-limited, and several prophylactic and therapeutic regimens which have been employed may deserve credit—at least for not interfering with the natural course of the disease. The evidence that Entero-Vioform is effective, either in prevention or in treatment, is inadequate.

Authority cited by the consultants includes an interesting experience (with Diodoquin) in which none of the volunteers fed cysts of Endamoeba histolytica apparently developed symptoms, whether or not they received the drug; another experiment (with Milibis) involved first 8 and then 14 subjects; and, finally, there was an uncontrolled study in which all the subjects took the drug (Entero-Vioform). On this basis, is it seriously suggested that 500,000 Americans take an arsenical or a drug containing 41% iodine for a month? In a report of the Council on Pharmacy and Chemistry on "Current Status of Therapy in Amebiasis" (J. A. M. A. 160:1230-1231 [April 7] 1956), the potential dangers of using drugs containing arsenic and iodine in the treatment of the disease are emphasized. This caution is even more applicable in prophylaxis. The manner in which Entero-Vioform is advocated—first in small doses to prevent the disease, then in larger doses to cure it, and, finally, in reduced dosage for continued "prophylaxis"—hardly inspires confidence in its use. The statement, "Entero-Vioform is of special value in treatment of amebiasis and is believed by many laymen outside the United States to be of value also against the bacillary dysenteries," is not documented.

In the original query the statement is made: "A number of persons return from Mexico with severe amebic dysentery in spite of hygienic precautions. This dysentery frequently proves refractory to treatment with all the modern amebicides." To the best of my knowledge, there are no satisfactory data on the incidence of "severe amebic dysentery" acquired by visitors in Mexico. Inaccurate diagnosis of amebic dysentery is often made in both Mexico and the United States. It is not true that amebic dysentery "frequently proves refractory to treatment with all the modern amebicides." Although some physicians prefer to use a combination of amebicides to produce an exceedingly high rate of primary cure, any one of a dozen currently used amebicides will cure a high percentage of cases.

Most patients with so-called refractory amebiasis either have been given a mistaken diagnosis or represent a group of individuals with a tendency to colitis which has been precipitated or aggravated by a specific infection. On several occasions I have seen patients, reported to have "amebas in the stools," immediately upon completion of a course of therapy that included emetine, tetracycline, an arsenical, and a halogenated quinoline. Unfortunately, even trained parasitologists have been known to confuse macrophages with trophozoites and yeasts with cysts!

A patient planning a visit abroad will often request his physician to suggest the use of a drug. The physician may resist such pressure with confidence, since his patient will undoubtedly succumb to the medical blandishments of friends, lay experts in diarrhea, and enthusiastic advertising. It might be wiser, until it is known what disease is being treated and what is the best treatment, to suggest a simple hygienic program. This may include dietary advice concerning the avoidance of salads and uncooked vegetables, the use of bottled water, a limitation on exposure to exotic foods, and the avoidance of excessive consumption of alcohol. If diarrhea develops, bed rest, the frequent consumption of tea, rice, and applesauce, and the use of simple antidiarrhea measures, such as kaolin with pectin or bismuth preparations and possibly camphorated opium tincture (paregoric), will permit the disease to run its brief course. Upon return home the patient should visit his physician for an examination and for proper study of the stool.

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VARIOUS ROUTES OF IMMUNIZATION

To the Editor:—*In the Aug. 3, 1957, issue of* The Journal, *page 1626, under the heading of "Various Routes of Immunization," the answer to the query states that reactions to tetanus toxoid, either routinely or as a booster dose, are extremely rare. While this has been generally accepted as being true, the widespread use of tetanus toxoid has brought and will continue to bring to notice reactions, some of which have been severe enough to incapacitate for days. In a study now in progress at our laboratories, this has been most noticeable in a National Guard unit. Many members of this unit had had service during World War II and the Korean conflict. Many had had three or four booster doses after primary immunization. Blood samples taken three weeks after injection with a combined diphtheria-tetanus adult product showed in most instances extremely high tetanus antitoxin titers. Out of this group of 57 men, 2 had reactions to the tetanus com-*

ponent severe enough to incapacitate each for a week. With the increased use of combined diphtheria-tetanus immunization, the tendency up until now has been to place the blame for all reactions on the diphtheria component.

We do not believe the statement, "because reactions to the later [tetanus toxoid] are extremely rare," to be true and have some evidence that, when diphtheria and tetanus toxoids are given together, the reactions are correlated with the rise in tetanus antitoxin response and are not correlated with the patient's response immunologically to diphtheria toxoid to the same extent.

James A. McComb, D.V.M.
Department of Public Health
The Commonwealth of Massachusetts
Jamaica Plain 30, Mass.

The above comment was referred to the consultant who answered the original query, and his reply follows.—ED.

TO THE EDITOR:—*It is true that the reply stated that reactions to tetanus toxoid are extremely rare, giving the impression that they were of little moment. Actually, the reactions which the consultant had in mind were those of an anaphylactic or allergic type. The latter are indeed rare. They never follow the initial injection and are extremely infrequent after the second injection given usually after a short interval. But they occasionally come on after the third or booster dose, which is given after a much longer interval, the patient having been sensitized allergically by the previous injection or injections. Patients with this type of reaction have urticaria and/or angioedema, with or without symptoms of shock, and the reaction itself may be immediate (in which case it is likely to be severe) or delayed in onset. Reactions of this type are true allergic reactions due to sensitization to the protein in the tetanus toxoid. They should be distinguished from toxic or nonallergic reactions, which can occur in anybody and often occur after the initial injection without previous sensitization. These are believed to be due to irritation from extraneous materials or impurities in the tetanus toxoid. The reactions may be entirely local, with swelling and induration of variable degree and duration, or they may be associated with constitutional symptoms, such as fever, malaise, and chills. Toxic-type reactions appear in a fairly high percentage of patients, especially adults. It is not surprising, therefore, that the correspondent found this to be true in the members of the National Guard unit; in fact, this is corroborated in a recent study by Boynton and associates. (J. A. M. A. 164:1874-1879 [Aug. 24] 1957). The latter reported that these reactions were fairly frequent among college students immunized with combined tetanus-diphtheria toxoid, although none were severe enough to militate against routine use of the toxoid. But it must be emphasized that the reactions which they reported, and which the correspondent apparently also had in mind, were of the toxic kind rather than anaphylactic or allergic reactions which are quite rare, particularly in infants or young children.*

TREATMENT OF MADURA FOOT

TO THE EDITOR:—*In the query and minor note on Madura foot in* THE JOURNAL *for Aug. 10, 1957, page 1723, the answer to this query was in part at variance with standard texts. It was stated that Madura foot is caused by Nocardia asteroides and that sulfadiazine is therapeutically effective. In reality, although Madura foot is frequently caused by Nocardia, numerous other fungous etiological agents have been reported, including Allescheria, Aspergillus, Penicillium, Madurella, Cephalosporium, Monosporium, Glenospora, and Indiella (Allen, A. C.: The Skin, St. Louis, C. V. Mosby Company, 1954, p. 488). Unlike Nocardia, these are all true fungi (not actinomycetes). As such, they are likely to be resistant to sulfonamides. No certain method of chemotherapy is known for this group. However, it might be worth trying some of the new fungistatics that are still in the experimental stage. Thus, it is essential to determine the etiological agent.*

Amour F. Liber, M.D.
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The above comment was referred to the consultant who answered the original query, and his reply follows.—ED.

TO THE EDITOR:—*It is unfortunate that we continue to use the nonspecific term Madura foot, and it will be noted that in the first sentence of the original answer, the field was limited by assuming that Nocardia had been proved as the etiological agent. The various other Actinomyces and fungi may cause a similar clincial picture, but in each instance therapy will be governed by identification of the specific organism.*

RECURRENT ABDOMINAL PAIN

TO THE EDITOR:—*Concerning the query on recurrent abdominal pain in an 8-year-old boy, which appeared in* THE JOURNAL *for Aug. 10, 1957, page 1724, allergy is mentioned as a possible cause by one of the consultants.*

A diagnostic test which I have found helpful in cases of this type would be an injection of 0.2 cc. of epinephrine, 1:1,000. If allergy is the cause, the pain is usually relieved within 15 minutes.

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